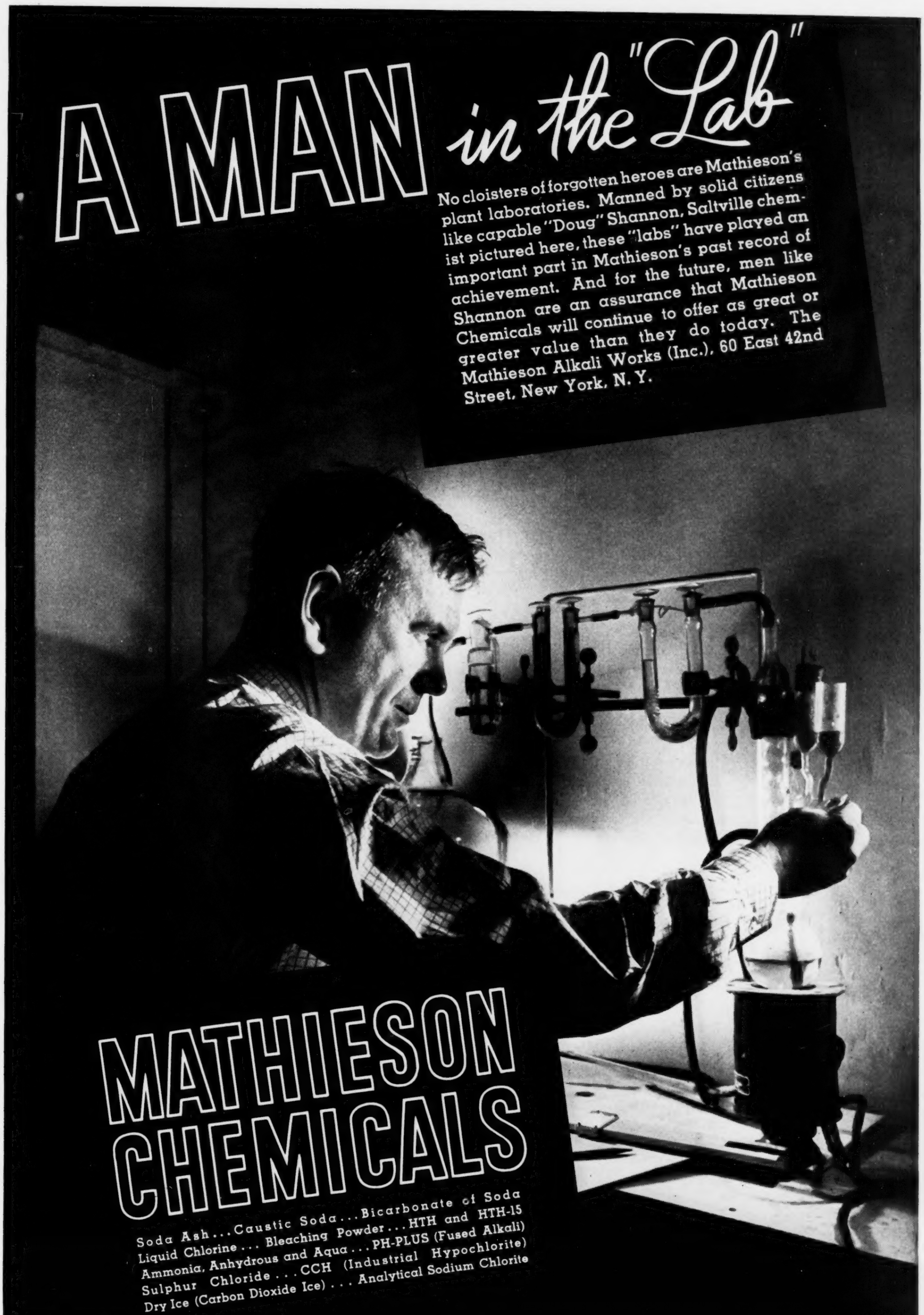

A MAN in the "Lab"
No cloisters of forgotten heroes are Mathieson's plant laboratories. Manned by solid citizens like capable "Doug" Shannon, Saltville chemist pictured here, these "labs" have played an important part in Mathieson's past record of achievement. And for the future, men like Shannon are an assurance that Mathieson Chemicals will continue to offer as great or greater value than they do today. The Mathieson Alkali Works (Inc.), 60 East 42nd Street, New York, N. Y.
MATHIESON CHEMICALS
Soda Ash... Caustic Soda... Bicarbonate of Soda
Liquid Chlorine... Bleaching Powder... HTH and HTH-15
Ammonia, Anhydrous and Aqua... PH-PLUS (Fused Alkali)
Sulphur Chloride... CCH (Industrial Hypochlorite)
Dry Ice (Carbon Dioxide Ice)... Analytical Sodium Chlorite

The Reader Writes:—

Chemistry with Real Gusto

Of course, you are right that we cannot claim everything chemical as belonging to us. If we did we would be claiming the entire universe since no part of it of a material nature is free from chemistry. Even the processes of the sending and receiving vacuum tubes of radio, although they are physical in nature, are absolutely dependent on the chemical properties and chemical purity of their materials of construction. I wouldn't know where to draw the line between chemical and non-chemical industries. The one thing of which I am certain is that the line is drifting in such a way as to include more and more of industry under the chemical banner. Consider the petroleum industry which only a few years ago seemed to pride itself on not being a chemical industry. At that time almost the only requirement of gasoline was that it would burn. Now it is almost essential that gasoline consist of nearly pure chemical compounds of very highly specialized structures. In recent years the men from my laboratory trained in the purest of pure organic chemistry have been taken almost greedily by the petroleum industry. Almost the same changes have taken place in the lubricants produced by the industries. My own characterization of the trend in the petroleum industry at the present time is that it is going in the direction of definitely tailor-made products. Such products can be made only with the help of chemists all the way from the original conception through the research laboratories and into the refineries. Even the salesman must soon know the significance of branching in the carbon chain.

The relation which you picture in your last paragraph of service by the major chemical industries to those which are less chemical in nature is only partly true. Of course, this type of service must be rendered to the smaller companies, but more and more the larger companies in fields like those of paint, petroleum, glass, textiles, etc., are setting up their own research and development projects to supply their own help in chemical fields. What's in a name anyway? Everyone uses chemistry consciously or unconsciously. As chemistry gains in power it will be more useful and more widespread.

To me the most important thing is that wherever you use it or whatever you call it, chemistry is such grand fun.

State College, Pa. FRANK C. WHITMORE

The Chemicalization of Coatings

Regarding your editorial on "Chemicalization," it is my opinion that the two broad classifications of the chemical industry comprise the heavy chemical field or those products of an inorganic nature and the organic field of which the dye industry would be typical.

It would be quite contrary, however, to the general consensus of opinion here, if the protective coatings industry would not be included in the chemical process field. I am not in accord with the view that just because a manufacturing industry does not produce definite chemical compounds, it eliminates itself from the broad chemical industry classification.

By way of illustration, the protective coatings industry requires a thorough chemical knowledge of all raw materials, and also the processes involved, in arriving at uniform products, including a broad knowledge of the specific purposes to which these products are applied.

It would be difficult to visualize the results which might be obtained in this industry if we did not have chemically trained men directing its various phases particularly because of the wide diversification of products.

A. M. TAYLOR,
Newark, N. J. Murphy Varnish Co.

Salesmen as Teachers

The term chemistry is becoming a matter of public consciousness, which has no difficulty in distinguishing between a blacksmith shop and a place where stainless steel is made, even though the products may appear much the same.

Salesmen in the electrochemical industries and in the pulp industry often appear as splendid lecturers before chemistry classes.

H. K. BENSON,
Seattle, Wash. University of Washington

Dollars and Dollars

You should be able to get a merry quip for your always amusing "We" department out of the fact that just after Secretary of State Cordell Hull receives the Robert Dollar memorial award for distinguished service to the promotion of American foreign trade, the Japs seize four and a half million of silver specie on a Dollar Line boat at Shanghai.

Hon. Hull gets the Dollar credit and the Japs take the Dollar cash, just as the Mexican communists got the "Gringo" oil and our Secretary of State swallowed the "Greaser" soft soap.

Houston, Tex. STARK DANIELS

Black as Midnight

My own idea of the pot calling the kettle black is the President reprimanding the Dies committee for political activities. I wonder, however, how long Americans will stand for this idea of Mr. Roosevelt's that "the king can do no wrong."

Cleveland, Ohio. F. H. HYDE

We Are Skeptical

You can hardly improve on CHEMICAL INDUSTRIES. It is next to my Bible in reading and learning.

Newark, N. J. HAMPTON AULD

Kerosene Afloat

On page 300, September issue of CHEMICAL INDUSTRIES, you show a cut of the Diesel ship, *Dolomite IV*, in connection with which the following statement is made:

"Said to be the first time that kerosene has been shipped in bulk by water."

For your information, American and European oil companies operating in the Far East have for years been shipping gasoline, kerosene, and other petroleum products in bulk into Japan, China, the Philippine Islands, and other Far Eastern countries with no apparent damage to either ship or material. Incidentally, these products were stored in steel tanks, as they are in the United States. Occasionally kerosene, and even gasoline, would take on color, but your statement is the first I have encountered advancing the theory that this was due to the corrosive nature of the product, thus causing the discoloration.

The matter is of little importance. However, I felt that you might be interested in correcting your statement should you find my contention to be correct.

San Francisco, Calif. J. H. MANNING

CHEMICAL INDUSTRIES

The Chemical Business Magazine

Who Pays for Efficiency?

"GOOD housekeeping" is much more than the outward and visible sign of operating efficiency. A clean plant is not only a well managed plant, it is also a safe plant in which to work and a good neighbor to its community. So true is this that in the public interest and for the welfare of its employees, the law demands certain standards of industrial housekeeping.

These are matters plainly of the public concern; and safety, particularly, is a humane issue in which the earning power, the health, even the lives of thousands of workers are at stake. With so good a cause and so many votes—we should say, so many workers—interested, why does not the American Manufacturers' Association start a movement to have the Federal Government manufacture and sell at cost—at the expense of the taxpayers, of course—the maintenance supplies necessary to keep all industrial plants so sweet and fresh that they shall be an ornament to their communities and a joyful environment for their workers. This would greatly increase the use of soaps, lye, T. S. P., carbon "tet.," brass polish, floor cleaners, paint, lacquer and other chemical supplies; extend the Government's activities; increase the federal payroll; reduce unemployment, and squarely hit a lot of other mixed objectives. It does make a plausible case to be pleaded with all the modern arguments.

Yet can you hear the howl if Industry asked the Government to help pay the bill of costs for an important aid to manufacturing efficiency? Practice is the reverse, for if a manufacturer does not keep a clean, safe plant, he is fined or imprisoned.

And yet the farmers of nine midwest states in solemn conclave at Des Moines last month petitioned the Government "to manufacture sodium chlorate and other chemical agents suitable for weed eradication at one or more federally financed hydroelectric plants . . . to be distributed without profit."

Now weeds are an outward and visible sign of bad agricultural housekeeping, and old-fashioned logic would in justice demand that since weeds take a toll of over three billion dollars a year, any farmer who does not within his own acres control this menace should in the public interest be compelled by law to do so. But—

Williams Haynes, Publisher and Editor; A. M. Corbet, and W. J. Murphy, Associate Editors; W. F. George, Advertising Manager; D. O. Haynes, Subscription Manager; J. H. Burt, Production Manager.

Formulated Fabrics Cloth is fast becoming a material as highly formulated as a modern coating. The natural and synthetic fibres are being spun and woven and chemically treated in all sorts of new combinations, creating cloths of new, valuable properties and novel, beautiful effects.

It is said that seventy-five per cent. of the materials used in women's sportswear are wholly or in part synthetic. Sun and salt water, ice and snow, perspiration, rugged wear—no garments face more exacting requirements—and in materials and style, American sportswear is a world leader. Palm Beach and similar "featherweight" weaves are not possible without these new formulated fibres, and out of his experience with them at least one big textile manufacturer has come to our own chemical philosophy of more sales at lower costs. Accordingly, he is carrying on practical research on new, compounded fabrics that will make it possible to sell men winter suits for $15. Three or four suits a year instead of one or two is a textile revolution as great as is promised by the new rayons for women's stockings.

Fooling or Fooled Is it better policy to veil the chemical character of an industrial specialty behind a trade name or to use a trade name as the identifying mark of a known chemical compound guaranteed by a reputable maker, is a question still needing a definitive answer. It is, after all, a straight-forward business problem, and a recent guest editorial in *The American Dyestuff Reporter,* by setting forth the viewpoint of the consumer in frankly commercial terms, stimulates sensible thinking. It asks: "Which is worth more to the maker and the seller, the mystery value to uninformed buyers, who seem definitely on the decrease; or some inkling of the true nature and value of the material to the intelligent buyers whose tribe seems to be rapidly increasing?"

This reveals clearly the user's preference for the known formula, a preference so strong that many firms, technically manned in production and purchasing departments, refuse point blank even to consider specialties about which they cannot have detailed chemical information. But there are other factors favoring the open formula.

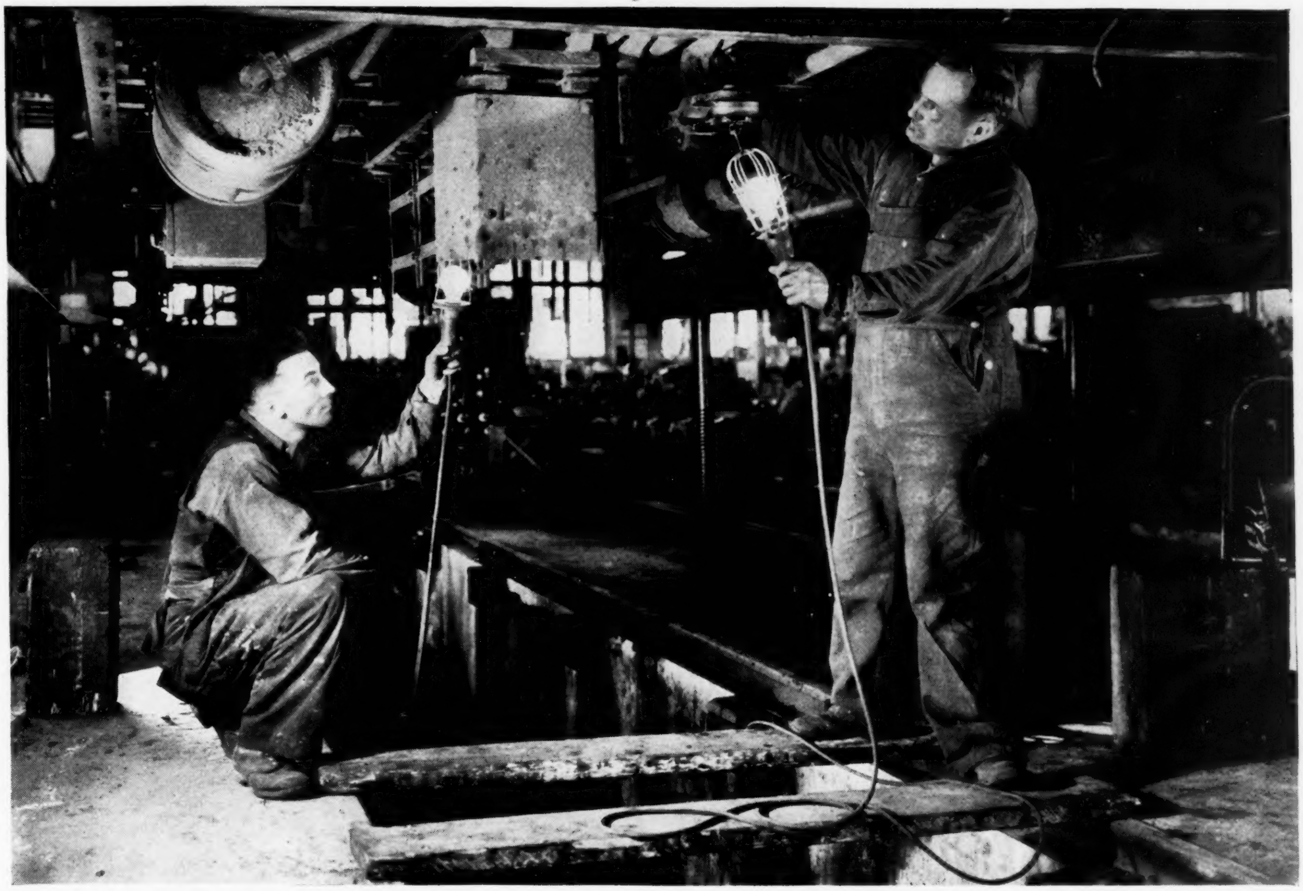
Only a simpleton dreams that a specialty can be kept truly secret. What one chemist can compound, another chemist can analyze. Furthermore, noting the growing number of intelligent buyers, a nimble-witted salesman can kill the mystery appeal by a few suspicions as to cost or quality or effect. Thus secrecy, while becoming less practical, becomes also less profitable; and American chemical specialty makers are coming more and more to the conclusion that it is not very smart selling policy to try to fool customers and competitors at a game that fools only the seller himself. The exception to the rule is, of course, the specialty tailor-made to fit the requirements of a particular consumer; but this is not, strictly speaking, a true exception, since such a material is not generally marketed.

In the household field the same arguments for the open formula have very much less force. Many a housewife now knows the detergent powers of T-S-P and the solvent properties of carbon "tet.," although the vast majority are not intelligent buyers in the industrial sense. Nevertheless, the scientific appeal is a strong one, and notable successes are being scored by makers who sell known formulas by simply told chemical sales arguments.

Both in plant and home the focal point of chemical specialty competition is shifting from price to service. In this it follows the tendency shown in the standard chemical field. As the largest chemical companies are almost without exception paying more attention to specialties, these trends will have some very notable results in chemical merchandising.

For Good or Evil Within the chemical industry proper the Wages and Hours Law affects few, but in chemical converting fields and among many chemical consumers, it necessitates some readjustments. No one can today judge the ultimate effects for good or evil that this revolutionary legislation will have. But, however well intentioned the law may be, there is no doubt that it has come into effect at a notably inept moment. To burden large areas of industry with greater costs and tangle them in more red tape, just when business is struggling up out of last fall's setback, is terribly bad timing for a law of admittedly dubious effects.

Laws to modify economic conditions or produce economic effects have often most unexpected effects. The avowed objections of the N. R. A., the Wagner Act, gold devaluation, silver purchasing, the undistributed profits tax, have all gone notably askew. Unemployment has risen a million and farm prices dropped a third since the present Administration took over, yet attempts to compel prosperity by law continue.



Practically all drop cords and extension lights are subjected to continued exposure to greases and oils. A test of various types of hose covers for this service was made in this insection pit of a large street railway. *See other photographs, pages 500 and 501.*

The Economics of a Synthetic Material

New Uses of Neoprene in Home and Plant

PRACTICALLY every problem of product development hinges on or is affected by the choice of the material or materials to be used. To complicate the situation, the development of suitable materials usually lags behind the need. In the early history of industrial development many really outstanding inventions were stopped completely because of the lack of a suitable material. For example, James Watt was forced to postpone development of his steam engine for years because of lack of materials adapted to the purpose.

Today, the machine or product designer is not ordinarily hampered as were his predecessors. However, these designers frequently develop products or machine parts that should be made of a material having a combination of properties not available in any existing material, so a more or less unsatisfactory substitution is made. This situation is most frequently encountered when the material for the required purpose should have the strength, abrasion resistance, resilience and elasticity of rubber, yet must be exposed to heat, oils, sunlight, ozone or chemicals—all factors which materially shorten the life of rubber.

This situation has been well known by chemical engineers for over a hundred years. It was at first believed that the solution to the problem would be the development of a method for producing a true synthetic rubber. Hundreds of chemists in every civilized country have tried their hand at this problem. In every case they failed. In fact, no one has, as yet, even determined the exact composition of any of the thousands of known types of raw rubber. However, it has been determined that the chemical known as isoprene is present in large quantities in rubber, and conversely, that isoprene is one of the simplest decomposition products of rubber. It is thought that the rubber hydrocarbon consists of very long chains of isoprene units chemically united. The composition of isoprene has been determined and this chemical has been produced synthetically, but this step only approaches the solution to the problem of producing a true synthetic rubber.

A corollary to this search has been the effort to pro-

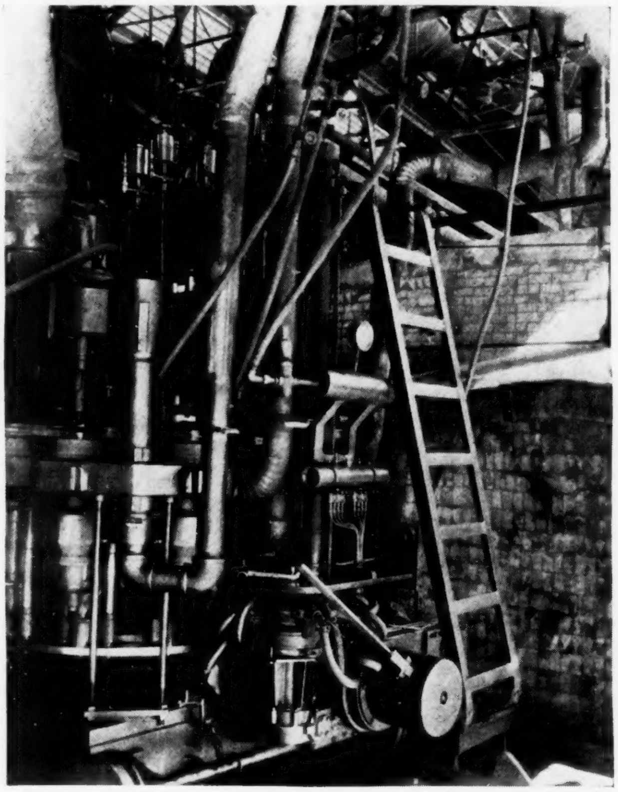
duce, on an economical basis, commercial quantities of rubber from plants other than the rubber tree. The best known of these experiments were those made by Thomas Edison with goldenrod. Edison and the other experimenters were pursuing a perfectly logical course. However, no plant contains anywhere near as much rubber as the rubber tree, and it is obvious that a very economical process would have to be devised for getting that little rubber before such a source would be commercially feasible.

Conveyor belts, exposed to high heat, oils, greases or chemicals, are covered with neoprene to insure longer life.

Actually, all efforts to duplicate rubber synthetically and to obtain even minute quantities from plants were based on the wrong premise. Nature created rubber latex, from which rubber is secured, for a definite purpose. There are a lot of theories about what that purpose is, but one thing is certain—Nature did not create rubber for use in belts, cable covers, molded goods, etc., although rubber has proved to be invaluable for thousands of uses and has become an almost indispensable part of everyone's daily life. All this despite the fact that rubber has definite limitations which restrict its usefulness in many applications and make its use impractical in thousands of other products. It was these known limitations which brought about a new approach to the problem.

One of the first to state this new thought was Dr. Wolfgang Ostwald, famed colloidal chemist, who said in 1913: "It seems to me that interest in artificial rubber does not today center in the possibility of finding a substitute for the natural product, but more in the possibility of making a decidedly better one; by the synthesis of a 'noble rubber,' a material which might be produced which would not only show properties superior to the ordinary natural article, but would also be of a marketable character." In short, the need was for a material which had rubber's properties but one which did not have its limitations. Such a material would not be a synthetic rubber as it would not have the same chemical composition. Neither would it be a rubber substitute as it could be used in many places where rubber could not be used.

It was this same attitude which guided the research work of the du Pont Company when in 1925 they began an extensive investigation of the rubber problem. These research workers did not try to duplicate natural rubber. They said: "Why should we assume that the product created by Nature for an entirely different purpose is the best material for making the thousands of rubber products that modern industry requires? Why be content to reproduce in the laboratory the product that Nature has provided? Let's start with different raw materials and produce a product that is even better adapted to present-day industrial requirements."



Glass machine tools are lubricated through the air hose and frequently maintained at high temperature. Both heat and oil caused the original rubber hose to fail rapidly. A section of the latter lasted about two and one-half months. This hose with both neoprene tube and cover has given twenty-four hour service for over a year and is still in good condition.

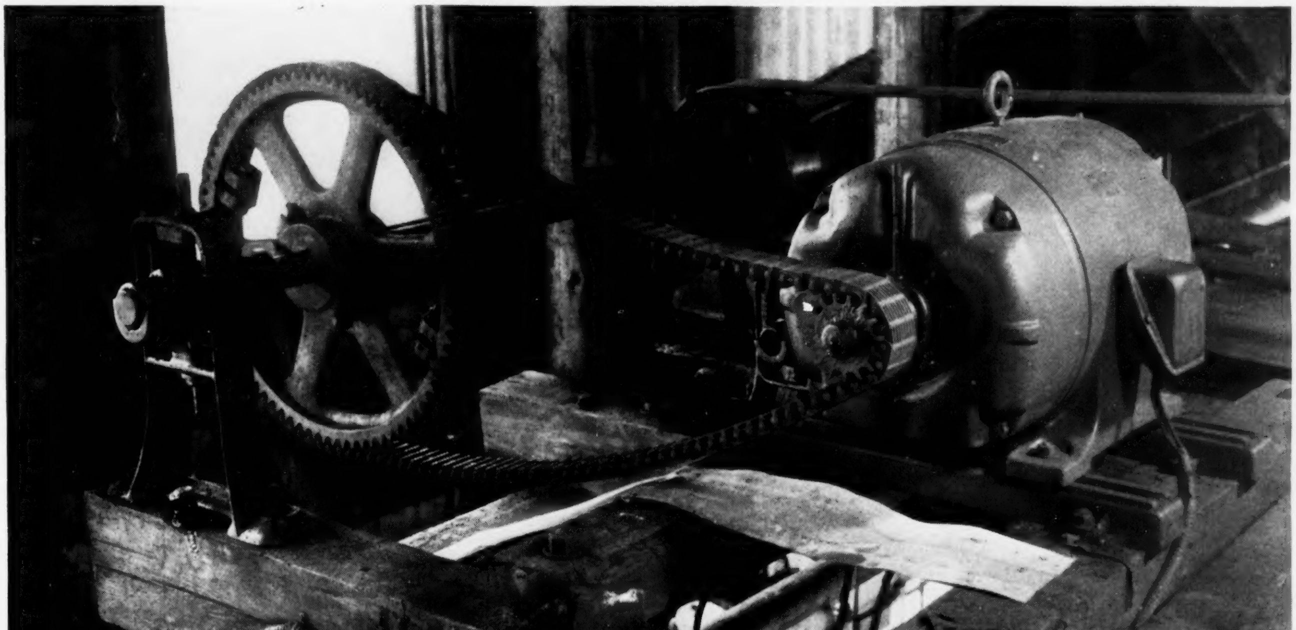
Following this plan, du Pont chemists began a careful investigation of all chemicals which might conceivably be used to produce the type of material they had in mind. One of the most promising chemicals was acetylene gas. This is the same gas that was used many years ago in the headlights of our automobiles and bicycles.

It was at this point in the investigation that a fortunate coincidence speeded up the eventual findings. A professor of chemistry at University of Notre Dame, Rev. J. A. Nieuwland, C.S.C., had as his hobby the academic study of acetylene gas and he was recognized as an expert in this field. Father Nieuwland was studying the gas purely from the research angle. He was investigating the derivatives of this gas, its reaction with other chemicals and so on through the long line of topics studied by the research man. In one of his experiments he passed acetylene into a solution of copper and alkali chlorides and, after modifying the process, he secured a yellowish oil and a gas with a peculiar and extremely noticeable odor. Dr. Nieuwland did not consider the new chemical he had isolated, divinylacetylene, to be of much commercial significance, but he read a paper on his development at a meeting of the American Chemical Society in 1927.

Again coincidence played an important part in the development of a "noble rubber." One of the chemists listening to Dr. Nieuwland's paper was Dr. Elmer K. Bolton of the du Pont Laboratories. Dr. Bolton recognized divinylacetylene as a chemical which offered unusual possibilities as a base from which a superior rubber might be created. Following the catalytic process discovered by Dr. Nieuwland, du Pont chemists converted acetylene gas to divinylacetylene in their laboratories. Attempts to convert divinylacetylene into a rubber-like material resulted in failure. But, members of the du Pont research staff later found that Dr. Nieuwland's process could be modified to produce monovinylacetylene, and further discovered that the treatment of monovinylacetylene with hydrochloric acid gas resulted in a previously unknown chemical which was called chloroprene. Their next discovery was that chloroprene could be converted by polymerization to a rubber-like solid, chloroprene rubber, superior to natural rubber in many respects. This material was first named "DuPrene," and in 1937 it was given the generic term "neoprene."

Here at last was the "noble rubber" so necessary for thousands of industrial uses. It is truly a rubber because it exhibits all of rubber's favorable properties. It is not a synthetic rubber as it has a different chemical composition. And it is obtained from materials which have no relationship with the rubber tree—coal, limestone, salt and water.

The major benefit of this material is that it resists deterioration to a remarkable degree when exposed to oils, greases, many chemicals, heat, sunlight, ozone and aging. These valuable properties have made the material of inestimable worth for thousands of products. Because of the expensive equipment necessary for the production of neoprene and the careful chemical supervision required in such production, the price of this material is considerably higher than that of natural rubber. This increased cost only affects the raw material itself. Neoprene, like rubber, is obtained by rubber manufacturers who combine it with other ingredients, process it and vulcanize it into the finished products. The cost of the other ingredients, the labor charges, the cost of other materials used with the resilient one and all the rest of the costs are the same for both neoprene and rubber. This, of course, considerably reduces the differential between the cost of finished neoprene and a finished rubber product. Again



Magnet wire covered with neoprene is being used on motors exposed to the fumes of acids and other types of chemicals. This magnet wire coating gives superior service under the difficult conditions of the application.

a very wide range of neoprene compounds are available. Each of them will have certain distinctive properties. Some will naturally be cheaper than others and can be used where a degree of resistance to deterioration is required, but where the ultimate is not necessary.

Despite this higher cost, applications of neoprene products are multiplying daily and a great many products which can be considered as mechanical rubber goods now have neoprene as a standard part of their construction. Such products include hose, belting, gaskets and seals, gloves, aprons, diaphragms, shoe soles, specially molded goods, cable covers and on through the long range of such equipment.

The accompanying illustrations very adequately sample this tremendous field. From the legends under the illustrations it can be perceived that neoprene has been of real value in practically every industry. In each case it is used because of its rubber-like properties, but it would not be used at the slightly higher cost if it did not offer very definite advantages. These advantages, of course, include the reduction in replacement cost made up by the cost of the parts and the actual cost of the replacement and a reduction in down time of equipment, frequently the largest single item in the expense. Also, in a great many cases the use of neoprene enables the designer to build a product which would have been impossible of conception through the use of any other material.

So now we have a material with rubber's properties, the use of which quite often offers considerable financial saving in the reduction of maintenance costs, and in many other cases makes possible the development of a product which would be denied industry if such a material were not available. It is the type of progress and the type of contribution which has always distinguished the work of the chemical industry. Through chemical research better things are created which make better industrial products and better home appliances.

Industry's Bookshelf

Chemical Kinetics by Farrington Daniels, Cornell Univ. Press, Ithaca, N. Y., 273 pp., $3.25. Most important contribution to a new, complex phase of chemistry that promises to bring practical engineering developments of value.

Physical Chemistry by Worth Huff Rodebush and Esther Kittredge Rodebush, Van Nostrand, N. Y., 468 pp., $3.75. Second edition, revised to simplify and bring up to date, of well liked elementary text.

Chemical Analysis of Foods and Food Products by M. B. Jacobs, Van Nostrand, N. Y., 537 pp. Systematic treatment of the entire range of foodstuffs—encyclopaedic in matter and practical in application.

Names of the Month—

A Current Supplement to the Chemical Who's Who

CARMICHAEL, EMMETT BRYAN, prof. physiological chem., Univ. Ala.; b. Shelbyville, Mo., 4 Sept. 1895; mar. Lelah Marie Van Hook, Denver, Colo., 23 Nov. 1921; educat. Central College, 1914-16; Univ. Colo., A.B., 1918, M.S. 1922; Univ. Cinc'ti., Ph.D. 1927. Univ. Colo., instr. organic chem., 1919-24; Univ. Cinc'ti., instr. biochem., 1924-26; Univ. Ala., ass't prof. & hd. dept. physiological chem., medical school, 1927-28; Univ. Ala., assoc. prof., 1928-32; prof., 1932 to date. U. S. Army 1918-19. Research in detoxification of ricin and immunity produced by single injection of partially oxidized ricin; detoxification of rattlesnake venom. Memb. A.C.S. (Chmn. Ala. Sect., 1934-35), Fellow Amer. Inst. Chem., A.A.A.S., Internat'l Coll. Anaesthetists (fellow), Amer. Physiolog. Soc., Soc. for Exp. Biol. and Med. Assn. Study Int. Secretions, Ala. Acad. Science(Pres. 1930-31), A.A.A.S. (councilor, 1931-35), A.M.A., Amer. Assn. Univ. Prof. Research Council, Univ. Ala. (pres. 1933-34), Amer. Assn. Hist. Medicine, Sigma Xi, Alpha Epsilon Delta (Grand Pres. 1932-38), Phi Beta Pi (So. Councilor, 1934-39), Alpha Chi Sigma, Gamma Sigma Epsilon. Hobby: philately. Address: School of Medicine, U. of Ala., University, Ala.

HAND, WILLIAM FLOWERS, prof. chem., state chem., Mississippi State College; b. Shubuta, Miss., 1 Dec. 1873; educat. Miss. State, B.S. 1893, M.S. 1895; Columbia, Ph.D. 1903. Anal. chem., Miss. State Chem. Lab., 1893-97; asst. state chem., 1897-99; prof. chem., Miss. State College, and state chem., 1899 to date. Dean School of Science, Miss. State College, 1916 to date; v-p., Miss. State College, 1935 to date. Memb. A.C.S., Am. Oil Chem. Soc., S.A.E. Fraternity. Hobby: handcraft. Address: State College, Miss.

HAYNES, HENRY ANSEL, pur. agt., Columbia Alkali Corp., div. pur. agt., Pittsburgh Plate Glass Co.; b. Boston, Mass., 2 July 1889; mar. Bernice E. Swinhart, Albuquerque, N. M., 15 July 1915, 1 son, 1 dau.; educat. Mechanics Arts High School, Boston. Dorchester Trust Co., clerk, 1907-14; Fred Harvey, Inc., cashier, 1914-16; Dorchester Trust Co., teller, 1916-18; B. F. Goodrich Co., cost accountant, 1918-20; Portage Rubber Co., pur. agt., 1920-24; Pitts. Plate Glass Co., Columbia Alkali Corp., pur. agt., 1924 to date. Memb. Akron Lodge F. & A. M. Clubs: Brookside Country. Hobby: fishing. Address: Pittsburgh Plate Glass Co., Barberton, Ohio.

KELLOG, HENRY B., patent contact man, chem. labs., Stand. Oil Dev. Co.; b. Brooklyn, N. Y., 5 Dec. 1904; mar. Ada M. Platow, West Point, N. Y., 12 Sept. 1935, 1 dau.; educat. Bklyn. Poly. Inst., B.S. 1926, John Marshall Coll. of Law. Amp Res. Labs., ass't-dir. of labs., 1926-32; Central Testing Labs., Dept. of Pur., City of New York, analytical chem., 1932-34; Spencer Kellogg & Sons, analytical chem., 1934-36; Borden Co., analytical & res. chem., 1936-37; Stand. Oil Devel. Co., pat. contact man, 1937 to date. Author of "Recent Advances in Volumetric Chem. Analysis." Memb. A.C.S., S.C.I., Phi Theta Delta (John Marshall College of Law). Hobbies: mineralogy, swimming, tennis. Address: Chem. Labs., Stand. Oil Devel. Co., Bayway, N. J.

STARKIE, THOMAS JAMES, v-p., Wishnick-Tumpeer, Inc.; b. New York City, 2 Dec. 1892; mar. Nellie Gibson Wright, Chicago, 1 Jan. 1920, 1 son, 1 dau.; educat. West Aurora High School. Harshaw Chem. Co., 1919-21; Wishnick-Tumpeer, 1922 to date. Sgt. 1st class, Base Hospital No. 13, 1918-19. Clubs: Chemists', Sales Executives Club of N. Y., Salesmen's Assn. of the Amer. Chem. Ind. Hobby: farming. Address: 295 Madison Ave., N. Y. C.

CREATING INDUSTRIES

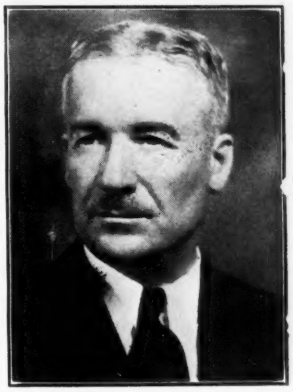
1918—1938

A Series of Fifty Articles Reviewing the Progress of American Chemical Industry

Hydrochloric Acid

By N. A. Laury

The economic status of hydrochloric acid has materially changed during the past two years, and the ultimate outcome of these changes is still unpredictable. The importance of the material has greatly enhanced the value of a study of the changes in its production and its uses, and at this time this review is peculiarly timely and important. N. A. Laury, B. S. chemistry, the author of this article, graduated from the University of Vermont, B.A., 1900; was plant manager in charge of operations for General Chemical Company for several years; has done consulting work in the chemical and metallurgical fields, particularly plant design and construction. For the past ten years he has been in charge, as technical adviser, of Process Developments for the Calco Chemical Company. He is the author of a book in the A.C.S. Monograph Series on "Hydrochloric Acid and Sodium Sulfate," and has written a number of other papers. Several important patents have been issued in his name.



The Fillers—Clay, Talc, etc.

By Poole Maynard

Poole Maynard took his A.B. at Johns Hopkins in 1905 and his Ph.D. in Geology and Chemistry at the same institution in 1909. He was Student Assistant in Mineralogy and Economic Geology for three years, an assistant geologist on the Maryland Geological Survey, the Virginia Geological Survey and the United States Geological Survey, and did development work on the iron ores in Alabama before 1909. He was elected a "Fellow" in the Paleontological Society of America; the Geological Society and the American Association for the Advancement of Science in 1909 because of his work in Paleontology and Geology; was Assistant State Geologist of Georgia from 1909 until 1912, then began the practice of consulting industrial engineering. He was the first to produce potash from the potash shales on a commercial scale; first to produce and market the chlorite micas and the Sericite micas. He developed processes for the beneficiation of bauxite; for the separation of magnesia and other chemical products from dolomites in association with Everhart. Since 1926 he has been Industrial Geologist with the Atlanta, Birmingham and Coast Railroad and since Aug. 15th last has been retained by the Atlantic Coast Line Railroad as Industrial Geologist.

This Series of Articles will be Continued Each Month

Hydrochloric Acid

1918—1938

By N. A. Laury

HYDROCHLORIC ranks below several other acids in value of output. The nitric acid made in a year is worth about twice as much in dollars, and the sulfuric nearly five times. It has, however, an extremely varied utility. In the last twenty years, for example, over two thousand items on the use and manufacture of hydrochloric acid occur in *Chemical Abstracts*.

The annual business in hydrochloric acid and sodium sulfate, of course, is a considerable item. The 1935 census gives a value of nearly seven million dollars for hydrochloric acid and sodium sulfate made and sold in this country, of which about five million is for the acid. Actual production of hydrochloric that year was 280,000 tons as 20° Bé. Imports of hydrochloric acid are insignificant, in 1937 less than four tons. Sodium sulfate is quite different, as imports now equal over half of home output.

Technical developments have been considerable from the standpoint of lowering operating costs and improving quality and in general efficiency, such as better storage and handling equipment, and control of exit gases.

There have been, moreover, great changes in the various economic factors which influence these products. They have been affected by the relative demand for chlorine and caustic, by salt cake imports, the developments in natural sodium sulfate deposits, cessation of nitre cake production, and other things. The price trend has been another disturbing factor; the salt cake price dropped about 30% in ten years; in the same period the acid price has risen, but only about 18%.

The sodium chloride and sulfuric acid reaction is with few exceptions carried on in mechanical furnaces. A few pot and muffle plants still exist and run under special circumstances that make them profitable, and some acid is still made in retorts with bisulfate as by-product; but most of our hydrochloric output is made in the so called Mannheim (mechanical muffle) and the internally fired rotary furnaces.

The former is still favored for units making ten tons or less of salt cake a day. For production of twenty or more tons the internally fired rotary is a cheaper and better plant. In recent years very large mechanical muffles have been built both here and in Europe. In the main they have followed the original design and thus the weaknesses of the old design still remain: heavy wear on the plows or floor scrapers, relatively heavy fuel costs for indirect firing at the temperatures required to produce salt cake of specified grade, and maintenance of a large muffle in tight shape in spite of shut-downs. Some mechanical muffle furnaces most recently built have the side walls and dome of the muffle made of carbofrax because of its greater heat conductivity. This is expensive construction, but seems warranted for its heat economy. There is, of course, danger of reaction between this refractory carbide and sodium sulfate when in contact at sufficiently high temperature. In recent installations greater pains have been taken to provide accurate measuring devices to insure correct addition of salt and acid. This is important with either type of furnace.

The strong grade, 22° Bé acid, cannot be made in the rotary. 20° Bé, of high quality, is easily made in spite of the dilute gases resulting from direct oil or gas firing. Thorough heating of the charge is facilitated and it results in salt cake running under one per cent. in salt and acid.

Absorption equipment has become pretty well standardized. Gases are first cooled in fused quartz S pipes and then absorbed in stoneware towers over which water and acid are circulated with air lifts or pumps. The circulating acid is cooled between towers in horizontal glass tube coolers. The concentrated gas from both muffle furnaces and retorts, as well as the gas from the combustion of chlorine and hydrogen, requires little tower space. The direct fired furnace must have a series of towers to afford time to scrub out a relatively large volume of gas. In either case the gases are scrubbed free of acid by passage through towers having an ample supply of cold absorbent.

A novelty in absorption equipment is a comparatively very small absorbing tower made of tantalum. A tower seven feet high and six inches in diameter will absorb 1,000 pounds per hour of HCl from 95% gas to make 22° Bé acid. This metal, of course, is completely resistant to the acid even when boiling. This tower is made of very thin sheets of the metal and as the process of

absorption proceeds only as fast as the heat is removed, it can be seen that a small metal unit will do the work of quite large towers and coolers made of stoneware, glass, or quartz. The heat transfer coefficient for tantalum from hydrochloric acid to water is 3,800 B.T.U. per sq. ft. per hr. per degree F. at 200° F. Tantalum is still so expensive that it cannot displace other equipment economically. However, in special places it is proving very useful. Superior economy is claimed for gases containing 80% or more HCl. Hastelloy and Durichlor are also suitable for coolers and pumps and are much cheaper than tantalum, though they do not possess its perfect resistance to corrosion. Haveg is another serviceable material for tanks and pipe lines.

A stoneware tower, with a cooling coil inside of each tower section between layers of packing rings, is offered. The coils are stoneware too, but it might be a good place to use the metals just mentioned because stoneware coils are pretty fragile for such a position.

The old Hargreaves process for decomposing salt with SO_2 and water vapor is, oddly enough, a comparative newcomer in this country. One plant, built in Louisiana in recent years, is in regular operation.

Hydrochloric Acid from Chlorine

Hydrochloric acid is obtained as a minor product incidental to the chlorination of certain organic compounds. No salt cake is produced in the process. According to information obtained by the Tariff Commission, the output of acid from this source has increased rapidly in the last decade. It amounted to 10,870 short tons of 100 per cent. acid in 1933 and to 14,651 short tons, or 17 per cent. of the total domestic output of hydrochloric acid, in 1935.

The output of hydrochloric acid from this source is determined by the demand for chlorinated products, for it constitutes a very minor item in the value of the output. Even were the price of the acid to fall below the cost of recovery, it would be necessary to recover it in most cases to prevent pollution of streams and the air. The demand for chlorinated products has increased appreciably in recent years. For example, phenol is made from chlorinated benzene by one of the largest producers. Paradichlorobenzene is produced also in large quantities by chlorinating benzene. Other chlorinated hydrocarbons produced in conjunction with hydrochloric acid are being used as intermediates in many products. This increased production of chlorinated products increases the output of hydrochloric acid. However, as some manufacturers of chlorinated products are developing new markets for their output of acid, the increased output from this source will displace only a portion of that produced by processes yielding salt cake as a coproduct.

The synthetic process for hydrochloric acid by direct combination of chlorine with hydrogen or natural gas does not yield salt cake as a coproduct. The synthetic process, however, accounts for only a small proportion of our total domestic production. According to data obtained by the Tariff Commission, the domestic output of synthetic hydrochloric acid amounted to 4,753 short tons of 100 per cent. acid in 1935, approximately 5 per cent. of the total domestic production in that year.

The cost of chlorine is an important factor in the production of synthetic hydrochloric acid. Chlorine is obtained jointly with caustic soda by the electrolytic decomposition of salt brine and, as the chlorine and caustic soda are formed in definite proportions, both must be marketed if the process is to be operated at a profit. Frequently the market for these joint products becomes unbalanced, so that there is a surplus of either chlorine or caustic. Under normal conditions, chlorine is too valuable to permit its use for synthetic hydrochloric acid, but when the demand for chlorine for other purposes is weak, a part of the surplus may be diverted to synthetic acid. At the present time, however, the demand for chlorine is so strong, owing to its increased use for chlorinated products, for water purification, and for bleaching, that relatively little is available for the manufacture of synthetic hydrochloric acid. In view of these strong demands for chlorine it seems probable that the production of by-product hydrochloric will increase greatly in the immediate future. If chlorine becomes decidedly cheaper, and if processes are developed for increasing the supply of chlorine without increasing the present surplus of caustic soda, the synthetic manufacture of hydrochloric acid may become of greater importance.

New Uses

Perhaps the most important new use for hydrochloric acid is in oil wells. Cotton seeds are now disinfected and delinted by tumbling in a current of HCl gas which is usually generated with 20° Bé hydrochloric and concentrated sulfuric, but a new method, now found very convenient, is to run chlorosulfonic acid into a generator containing salt and subsequently adding water. Miscellaneous uses for anhydrous HCl are increasing in number. Recent patents specify it in making ethyl chloride and amine hydrochloride, and the quantity used in making anhydrous magnesium chloride for electrolysis to metallic magnesium is considerable. There are other places, such as in carbonizing wool, where it probably would be used in much larger quantity if it were available in the convenient form of a liquid in cylinders under pressure.

Monocalcium Chlorophosphate

The Bureau of Chemistry and Soils has recently published experimental work on an economic application of hydrochloric acid in phosphate fertilizer manufacture. Monocalcium chlorophosphate is produced. The primary reaction between phosphate rock and hydrochloric acid yields calcium chloride and phos-

phoric acid in solution. At high concentrations a secondary reaction between phosphoric acid and calcium chloride yields solid monocalcium chlorophosphate and liberates hydrochloric acid which further attacks the rock.

The physical and chemical properties of monocalcium chlorophosphate suggest its possible use as a phosphatic fertilizer material. It may be prepared from hydrochloric acid, phosphate rock, and phosphoric acid with an economy of reagent materials over current practice in the production of dicalcium phosphate by the hydrochloric acid process.

A crude monocalcium chlorophosphate essentially free from calcium chloride and suitable for fertilizer purposes may be prepared, by drying a mixture of phosphate rock and phosphoric and hydrochloric acids. A typical product, made from Florida pebble contained 34.84% total P_2O_5, 31.30% water soluble P_2O_5, 0.51% citrate soluble P_2O_5, 15.03% Cl and 27.22% CaO. The product is about as hygroscopic as sodium nitrate, ammonium sulfate, and urea which are commonly used in fertilizer mixtures. Its solution is neutral to methyl orange and at 300° C. it loses water and hydrogen chloride.

Sodium Sulfate

In addition to the processes using salt and sulfuric acid or nitre cake, and also salt and sulfur dioxide, there is a substantial bi-product output of salt cake, chiefly from the manufacture of bichromate. This product is colored yellow by chromium compounds, but these are easily removed when the material is dissolved before use, for sodium bisulfite or sulfur dioxide reduces and precipitates a chromium compound which rapidly settles out. The manufacture of formic acid is another source of by-product sulfate of sodium, but a small one.

In 1935 only two concerns, one in Texas and the other in California, produced salt cake from natural deposits. Both produced anhydrous sodium sulfate as well as salt cake. The domestic output of all forms of natural sodium sulfate in that year amounted to 38,706 short tons, or approximately one-fifth of the total domestic production of natural and chemical salt cake. Domestic output of sodium sulfate for 1937 amounted to 80,053 short tons, with a value of $599,-266. Substantial quantities of natural salt cake were formerly mined in Arizona and Nevada, but these deposits have not been operated since 1933.

The domestic output of chemical salt cake might be increased very substantially by the present methods of production if new markets were developed for hydrochloric acid or if the price of salt cake should rise sufficiently to insure a profit notwithstanding the limited market for hydrochloric acid in the South. Moreover, other methods of producing chemical salt cake, not employed at present, might be utilized if the price of salt cake were high enough to warrant.

Hydrochloric acid, produced jointly with salt cake, might be used to treat phosphate rock to produce dicalcium phosphate. This material, a valuable ingredient in fertilizers, must be produced at low cost to compete with superphosphate from phosphate rock and sulfuric acid. Production of dicalcium phosphate by this method would be accompanied by an increase in the supply of salt cake.

In the rayon process, cellulose is dissolved in caustic soda, which is later removed by neutralization with sulfuric acid, thereby forming a dilute solution of sodium sulfate. Salt cake is obtained by evaporating the water from this solution. A few concerns produce salt cake by this method for their own use, but practically none of this material is recovered at present because of the cost of evaporating the water. A substantial rise in the price of salt cake might make this recovery economically feasible. The viscose rayon industry, operating at 100 per cent. of 1935 capacity, would recover more than 30,000 short tons of salt cake annually.

Experiments are being conducted by the U. S. Bureau of Mines to produce potash from the complex mineral, polyhalite, which contains among other things, magnesium sulfate. When treated with ordinary salt, magnesium sulfate yields salt cake. This process (details are described in a recent report by the Bureau) is similar to that used in Germany to produce salt cake from magnesium sulfate obtained from refining potash. Since domestic deposits of polyhalite occur in Texas and New Mexico, their utilization for salt cake would be influenced considerably by transportation charges to consuming markets.

The U. S. Tariff Commission in its Report No. 124, published 1937, has an interesting discussion of the competitive conditions in our markets. Prior to 1928, practically all salt cake used in this country came from domestic sources with a small surplus available for export. Since then, the United States has become a large importer, owing to the demand for salt cake in the expanding sulfate pulp industry. At present imports supply approximately two-fifths of our consumption.

North Atlantic and North Central Markets

In recent years, following the decline in the domestic production of chemical salt cake incidental to changes in the methods of producing hydrochloric acid, output in the North Atlantic and North Central States has approximately equalled consumption in those areas. This, in conjunction with lower transportation costs within that area itself than to the distant markets in the South, accounts for the fact that practically all chemical salt cake produced in the Northern States is marketed locally. Accordingly, little natural salt cake from the West, or imported salt cake, is marketed in the North Atlantic and North Central States.

In the Southern States a large and growing market for salt cake exists in the sulfate pulp industry; but production in that area is relatively small because of the limited local market for hydrochloric acid, the joint

product in the present processes of producing chemical salt cake. Consequently, the Southern States depend upon outside sources for the bulk of their supply of salt cake, and as demand increased rapidly after 1928, owing to expansion of the sulfate pulp industry, an increasing proportion in that area was obtained from foreign sources. In 1935, 70 per cent. of the salt cake used in the southern sulfate pulp industry was supplied by imports, chiefly from Germany, which produces a large surplus of salt cake jointly with hydrochloric acid and also in conjunction with potash refining. The increasing imports relative to total consumption in the South are attributed to several factors. Many of the southern pulp mills are located near tidewater; and as ocean freight rates are lower than rail rates, the German product can be brought to these mills at a lower cost than can western natural salt cake. In 1935 the weighted average cost of transporting salt cake from foreign producing points to the Southern States was $5.83 per short ton east of the Mississippi and $7.49 west of the Mississippi. The transportation rates for natural salt cake from Trona, Calif., Mina, Nev., and Clarksdale, Ariz., to representative consuming points in the South are $9 or $10 per short ton. With the present delivered price of salt cake in the South slightly under $15 per short ton, very little natural salt cake moves into that area from Trona and none from Mina and Clarksdale, the two latter deposits not having been operated since 1933.

Estimated Cost of Production

Cost of production data was not obtained by the Tariff Commission for salt cake, but the consensus of trade opinion is that it cannot be produced from natural deposits at less than $6 or $7 per short ton, f.o.b. producing point. These estimates are for operations where the salt cake is produced from natural deposits as a main product and not, as in the Trona operations, jointly with other products. With production cost of $6 or $7 per short ton, with freight rates of $9 to $10 per short ton, and with allowance for selling and other expenses incidental to delivery, a delivered price of $17 to $20 per short ton would have to prevail to insure extensive operation of the western deposits now idle.

The competitive situation is somewhat different with respect to the operations at Monahans and Trona. Monahans is relatively near the southern markets, west of the Mississippi, where many of the pulp mills are located inland. At present prices, there is a substantial movement of natural salt cake from Monahans to the west-Mississippi markets with a transportation rate of $4.40 to Monroe, La., or roughly $3 per short ton less than the average cost of moving imported salt cake into that area. In Trona, where salt cake is produced jointly with other products, cost is probably somewhat lower than for salt cake produced as the sole product. However, with a delivered price of under $15 per short ton, only a small quantity of natural salt cake moves from Trona to the South.

Comparatively little salt cake is produced in the Southern States. When demand began to increase in the South, one concern in Louisiana undertook production in conjunction with hydrochloric acid by the sulfur dioxide process. This operation was undertaken primarily for salt cake, then selling at about $20 per short ton. At present, this concern produces some salt cake for nearby southern markets. According to press reports, one large chemical company is planning to construct a plant in the South for the production of chemical salt cake, and although information is not available regarding the process to be utilized, it is not likely that it will involve the production of hydrochloric acid, since a market for hydrochloric acid is limited in that section. Other operations might convert hydrochloric acid into chlorine, for which there is an increasing demand in the South for bleaching wood pulp and textiles, and into hydrogen. As noted above, the sulfate pulp industry is expanding rapidly, and the new mills planned will more than double the amount of pulp now produced in that area. This expansion will increase demands for both salt cake and chlorine in the South.

If the price of salt cake should rise to a point where its manufacture would be profitable without the disposal of jointly produced hydrochloric acid, or if large markets for hydrochloric acid should develop in the South, there will probably be an increased production of salt cake in that section by existing or similar methods. There is also the possibility of producing salt cake in the South at present prices by methods that yield no hydrochloric acid. Thus, under either condition, domestic chemical salt cake may supply a larger share of the expanding southern demand than salt cake from natural deposits, especially from those which are not operating at present prices and transportation rates.

Pacific Coast Market

In Washington and Oregon production of sulfate pulp requires a considerable quantity of salt cake, practically all of which is obtained from sources outside those States. In 1935, approximately 30 per cent. of that consumption was supplied by imports, largely from Germany, and the remainder from domestic sources, chiefly California. The average cost of transporting imported salt cake to the Pacific coast market, where many pulp mills are located near tidewater, was $5.98 per short ton in 1935, or approximately the same as the rail freight rate from Trona, Calif., or Mina, Nev., to that market. At present, there is a substantial movement of natural salt cake from Trona to the north Pacific coast, but the Mina plant has been closed since 1933. The rail freight rate on natural salt cake from Clarksdale to the Pacific coast is $10 per short ton, and no shipments are made.

Salt cake is produced in Germany: (1) by treating salt with sulfuric acid and (2) by treating magnesium sulfate, obtained from refining potash, with ordinary salt to produce salt cake and magnesium chloride. At

present most of the magnesium chloride is discarded, but plans are reported for utilizing this waste in metallic magnesium. The project, if successful, will lower the cost of producing salt cake.

The first-mentioned process is that used in the United States to produce chemical salt cake, and the products are similar in composition. Salt cake from the second process, known as Kaiseroda, is of higher purity than ordinary chemical salt cake. A typical sample of Kaiseroda material contains 98.3% of sodium sulfate, 0.0885% sodium chloride, 0.356% magnesium sulfate, 0.22% gypsum, 0.011% ferric oxide, 0.032% iron and aluminum oxides, and no sulfuric acid.

German production of sodium sulfate was estimated at 330,000 short tons in 1929, of which 140,000 short tons were Kaiseroda salt cake. In 1931, German production declined to 250,000 short tons, one-half Kaiseroda. Statistics for recent years are not available, but increased German exports suggest that output exceeds earlier years.

Kaiseroda salt cake is made only by the Wintershall group of potash producers. A number of German concerns produce chemical salt cake, four accounting for the bulk of the output. All German producers, with the exception of a few small concerns, are members of the Sulfate Union of Frankfort which dominates the European Salt Cake Association. Although formed primarily as an export association for closer control over export prices and to facilitate marketing in foreign countries, the Sulfate Union exercises considerable control over German internal sales. Individual members, whether selling in local or foreign markets, must file copies of all contracts. The Sulfate Union is said to pool sales and to equalize freights so that each member receives an equal net return per ton of salt cake sold. Thus, notwithstanding that some German producers are located a considerable distance from seaboard, while others have only short barge hauls to the seaboard, freight charges to export shipping points are the same to all members of the Union.

The predominant position of Germany as an exporter of salt cake is due in considerable measure to the large production of hydrochloric acid and potash in that country and to the relatively small local demand for salt cake. The German potash industry is the largest in Europe, and hydrochloric acid, being used in great quantities by the German chemical industry, is also produced in substantial volume. Thus, large quantities of salt cake are obtained as a coproduct of these industries; and this surplus is exported, particularly to the Baltic countries and the United States, where demands for salt cake for sulfate pulp are large.

Canada produces small quantities of salt cake from chemical sources, but the bulk of the Canadian output is mined from natural deposits located chiefly in Saskatchewan and Alberta (north of North Dakota and Montana). It is estimated that these deposits contain 120,000,000 tons of sodium sulfate, reputedly of good grade and comparable to the deposits of Grenora, N. D. Exploitation of the Canadian deposit began about 1920, but production was small and for many years the bulk of the salt cake used in Canada was supplied by imports, largely from the United States.

The U. S. Tariff Commission's report No. 124 gives a good deal of valuable tabulated data on salt cake from which the following are taken:

	Tons
Quantities from the main sources for 1935—	
Chemical salt cake (made and sold)	131,136
Natural salt cake (made and sold)	38,706
Imported	116,719
	286,561
Consumption by industries in 1935—	
Sulfate pulp	216,775
Heavy chemicals	31,262
Glass	31,325
Other and undistributed	16,649
	296,011

It is evident that some problems are here set up for American chemical industry. How shall we meet the large prospective demand for salt cake in the South at costs competing with imports? What of the high cost of natural salt cake to pulp producers in the case of the shutting off of German shipments? Obviously, with salt and sulfuric at hand, it would be advantageous to the southern pulp mills to have a process that yields salt cake and chlorine from these materials.

Lincoln Welding Foundation Awards

Jury of Award of James F. Lincoln Arc Welding Foundation, Cleveland, after judging thousands of papers submitted in the $200,000 Award Program, found that savings to industry by arc welding claimed by authors of papers aggregate $1,600,000,000. Jury's statement, released Sept. 15 at the conclusion of its judging of the papers, follows:

"The Central Committee of the Jury of Award of the James F. Lincoln Arc Welding Foundation finds that the savings to industry by arc welding claimed by authors of papers aggregate $1,600,000,000. This figure is arrived at after discounting some very enthusiastic claims. It is an amazing figure and undoubtedly would have been much greater had all of the authors estimated gross savings from the application of arc welding to their products."

Altogether, 382 awards were made. The amounts ranged from $101.75 for honorable mention to $13,941.33, the Grand Award. Recipients included engineers, designers, architects, production managers, superintendents, draftsmen, shop foremen, mechanics, inspectors, welding operators, welding supervisors, owners of businesses, college professors, high school instructors, students, and others. Subjects of studies in the 44 divisions of the Program, represented practically every product and structure of industry.

The Grand Award of the Program, $13,941.33, went to Mr. and Mrs. A. E. Gibson, president and stockholder, respectively, Wellman Engineering Co. The paper, "Commercial Weldery," entered in the Welderies Classification of the Program, is an outstanding treatise on all the elements required to assure the business and technical success of all users of welding throughout industry.

The Fillers—Clay, Talc, etc.

1918—1938

By Poole Maynard

UNTIL about 1917 American users of mineral fillers were of the impression that nowhere in the United States was it possible to find clays equal to the English China clays; that no talcs could be found equal to the Italian; that no high calcium raw materials could in any way replace the English and French "whiting"; that filler materials like the bentonites of the Wyoming type or the talc-like materials such as the pyrophyllites or such rock micas as the sericites and the chlorites could not be introduced into manufactured products.

As to the occurrence of various non-metallic materials used as fillers, the geologist was well aware that nowhere in the world was there a wider variety of such raw materials than in the United States; but the geologist in that day was in no sense a technologist and he had no conception of the physical and chemical requirements of the mineral fillers for the trades. In this country a transformation in the preparation and utilization of mineral fillers was brought about as a result of the war in Europe and during this transition stage we were using in our desperation a hodgepodge of everything and anything. Fillers were then looked upon largely as adulterants, something as cheap as possible, something chemically inert, something that would do the least possible harm. By the close of the war in 1918 the manufacturing industries realized that they had been actually using American raw materials; that in many instances these raw materials had proved to be better adapted for the manufacture of their products, and that dependence on foreign sources of supply was not an economically sound policy.

The evolution of the mineral fillers industry has been a rapid one. The filler producers for the first time recognized that they could only hope to obtain a market for their products by demonstrating their value in the products in which they would be used. The manufacturers of machinery were finding out through experiment how their machinery could be improved so that mineral fillers of greater fineness could be economically produced. The producer soon realized that his product must at all times be dependable and uniform; that his raw materials were practically always improved by some form of beneficiation; that the cry of the manufacturers was always for fillers of more finely divided particle size, and so, as we look back, we realize that the mineral fillers industries, as such, prior to 1918 are mostly obsolete today.

The most important of the mineral fillers are the kaolins and the so called China clays; the talcs and such allied raw materials as pyrophyllite; the high calcium marbles and limestones processed into whiting and the precipitated calcium carbonates; the rock micas known as sericite and chlorite, having some of the characteristics of mica and some of the peculiarities of talc; the bentonites and certain types of Fuller's earths, and such a well known material as wood flour. The origin of the raw materials used as mineral fillers is of very great importance, for upon the origin largely depends the physical character of the fillers, such an important factor in a determination of the adaptability of the raw materials for manufacturing use.

The China clays are derived from high aluminous materials, such as the feldspars, by decomposition and secondary combination of the essential clay elements, namely silica and alumina in combination with water, and all of this alteration taking place "in situ." The typical China clay is that produced in the Appalachian Mountain area in North Carolina.

The kaolins are also derived by the decomposition of highly aluminous igneous materials, such as the feldspars, but the kaolins are secondary sedimentary deposits, formed either by the transportation and deposition of the clay particle after the decomposition of the feldspar, or the partially decomposed feldspar may be transported and altered to kaolin by downward circulating carbonate or sulfate waters.

Just as China clays differ somewhat in physical and chemical character due to differences in the raw materials from which they have been derived; in the time they have been exposed to the agencies of weathering; to the acid bearing waters which brought about decomposition of the feldspathic materials; to the composition and presence of magmatic waters and gases, just so there are wide differences in the kaolins. There are differences in color, differences in the nature of the impurities and differences in grain size, because of differences in hydration of the clay mineral, which

may have been influenced by the presence of organic matter and subsequent downward circulating acid solutions. It is generally accepted by authorities in petrography that kaolin is the dominant mineral in both kaolin and China clay, yet these fillers are very different in physical and chemical character because of their life history, their environment.

The talcs, hydrous magnesian silicates, may be derived either from igneous rocks, or as replacement deposits of such a material as dolomite, where the lime in the dolomite is metasomatically replaced by silica. There are many varieties of talc due to differences in the type of the raw materials from which the talc has been derived and to its life history, its environment. The soapstones are the so-called impure talcs and are of igneous origin. The St. Lawrence County, New York, talc deposits are known as Rensselaerite, differing in physical property from most talcs in that it does not have the usual talc "slip" and most of this talc is of fibrous nature.

Pyrophyllites

The pyrophyllites are mined almost exclusively in North Carolina. They have many of the physical properties of talc, but in chemical composition they are hydrous clays and originally are apparently of volcanic origin.

High calcium marbles and limestones are the source of the large tonnage of American "whiting." The first plant to prepare an American "whiting" from marble was built in Georgia shortly after the beginning of the World War. While high calcium limestones are widely distributed, there are relatively few deposits suitable. Precipitated calcium carbonate, a by-product in the manufacture of wood pulp, is being widely used as a filler, particularly in the manufacture of newsprint.

The bentonites are weathered and altered volcanic ash. Their composition is very similar to that of clay. The bentonites may be classified into two broad types, namely the Wyoming type and the Mississippi type, each very different in physical properties, and no raw material is so little understood by the technical man. The Wyoming bentonite was first described as "soapy clay." It is a natural hydrous silicate of alumina characterized by the formation of a highly viscous solution in the presence of not less than ten times its weight of water. Mississippi bentonite is somewhat similar in chemical composition; but very different in its physical properties. The Mississippi type does not carry any free alkali and does not have the pronounced property of adsorption, being about equivalent to the Fuller's earths when the bentonites are oxidized thoroughly. The Mississippi type is widely distributed in Mississippi, Georgia, Florida and in limited areas in Oklahoma, Arizona and California. Deposits will certainly be found in other states of the South. When these bentonites are activated by sulfuric or hydrochloric acids, many of them are made suitable for use in the refining of mineral and vegetable oils.

The micas are of increasing interest for use as mineral fillers. The sericites and chlorites, known as rock micas, are like the other micas of igneous origin. Since new methods of beneficiation of the micas are making possible the commercial production of the white micas at a reasonable cost, there seems to be a large field ahead for their application as fillers.

Before the English China clays were mined and refined in England the Southern kaolins were mined as crude clays and beneficiated by hand sorting and shipped to England. Progress in methods of refining developed much faster in England than in America, and China clays whether they were English or American were found to have certain advantages for use in the manufacture of pottery products.

Colloidal Kaolins Most Desirable for Fillers

The writer recognized as early as 1916 that the colloidal types of kaolin were the most desirable for use as fillers. Thorough washing of these clays (90% water and 10% clay) made it possible to lower the iron content from 1.50 per cent. to 0.51 per cent. The titanium oxide was reduced from more than 1% to less than 0.5%. Here was evidence that little of the iron was combined with the alumina, but associated with the coarser impurities, and that most of the titanium was present as rutile and illmenite.

Without the use of electrolytes these clays could not be settled to more than 20% clay matter; the clays being too finely divided to filter press, and dewatering by the continuous centrifuge was not yet practical. The clay must be dewatered by evaporation and that was costly, but not too costly for the value of the product obtained. The American clay producer was not yet ready for technical control in his clay refining plant. By 1918 our ceramic industries were using all of the American China clays that were produced and these clays were being almost entirely mined in North Carolina. The development of the American China clays could only take place slowly, so the filler industries of the United States turned to the kaolin deposits of the Southeast, and they turned to the development of these kaolins largely as a result of the legitimate propaganda of certain of the railroads of the Southeast, making known the location of the deposits, with very definite, authoritative information on these materials.

While American clay producers had learned much about the refining of kaolins, they were wedded to the filter press for the dewatering after settling, so they were forced to confine their operations to kaolins of coarse particle size. As usual in the development of any industry many influences were responsible for improvements. The manufacturers of machinery made possible better facilities for dewatering the clays. The clays were settled with classifiers; the centrifuge has been more recently applied to advantage not only in the dewatering of clay suspensions, but in the separa-

tion of clay particles and in the removal of grit. Chemical reagents have been used to settle clays by coagulation. Air separating machinery and air classifiers have made possible the separation of the large size clay particles and the grit from the smaller clay particle. There is quite a bit of clay lost in dry methods of separation of grit and other impurities from clay, but even then the cost is much less than are washing costs and air refined clay meets the requirements of many of the manufacturing industries.

Flotation for Removal of Impurities

Shaw[1] has demonstrated that many impurities in clay can be removed by flotation. He says that Mac Quisten developed a process known as film flotation and that his (Shaw's) method is a close application of the Mac Quisten process. Apparently the most valuable thing about the Mac Quisten process that Shaw further developed is the fact that the finely divided impurities in the clay, usually the most difficult to deal with are readily eliminated, because the finely divided particles are most easily floated. It is easy enough to separate the coarser impurities in the ordinary method of elutriation.

The manufacturers of the colloid mill have been demonstrating to the chemical industries that certain clays they were purchasing could be further subdivided and better sizing emulsions could be made possible through finer grinding of the clay particle and more intimate mixing.

Certain of the ceramic schools, the Bureau of Standards and the Bureau of Mines were attacking problems of refining and problems of application with considerable success, particularly in the use of American kaolins in the ceramic industries.

The greatest improvement in clay refining has been based on English patents for the bleaching of American kaolins.

Until very recently the manufacturing industries using talc and the American talc producers had apparently resigned themselves to the belief that the Lord had made the several varieties of talc, so that they could not change either the physical or the chemical properties by various methods of beneficiation. While it is very true that certain talcs of igneous origin which might carry a large amount of iron in the form of the silicate could not be commercially bleached and that the various physical characteristics of the talc particle, such as a platy or a fibrous structure were due to crystallization, yet it was possible to alter both the physical and chemical character of various talcs in methods of processing.

E. M. Gardner says[2] "The principal improvement in the production end since 1917 has been the increase in the standard of grind. Some twenty years ago a product which would pass 97 or 98 per cent. through a 200 mesh was considered standard. Today 99 per cent. or better will pass through a 325 mesh screen. In the past two years this company has still further increased the fineness of grind and is now shipping a grade which will pass 100 per cent. through a 325 mesh."

Some interesting work has been done on the concentration of the Vermont talc magnesite ores[3] by the Bureau of Mines in cooperation with the Eastern Magnesia Talc Company. Their conclusions are as follows:

> "Small scale batch tests and pilot plant flotation tests on Vermont talc magnesite ores show that these ores may be beneficiated by flotation to make talc concentrates and magnesite tailings. Talc floats readily with a variety of reagents and may be recovered in a high grade product of improved 'slip' and color. The magnesite tailings may be suitable for certain uses and thus constitute an additional source of revenue to the talc producer."

Talc Consumption

Consumption of talc has varied little for many years, while the large increase in the use of other fillers indicates that little progress has been made in talc refining. The application of fine grinding, air separation and the so called "throw out" device of eliminating grit, represents recent progress in this field.

Preparation of an American whiting, other than precipitated calcium carbonate, usually made as a by-product, is the direct result of the war in Europe. The dry ground marbles and limestones have a limited market, but when these same materials are wet ground they can be used to advantage in many filler industries.

Bentonite of the Wyoming type is all mined west of the Rockies. It is usually passed through rolls and crushed to ⅜ inch or smaller, since larger size particles are not readily dried. Proper drying is the most important thing in its preparation. Rotary driers have been developed with temperature recorders, with conveying and stirring equipment, and with counter flow heating. After the bentonite is dried it still carries about 8% moisture, but appears as a perfectly dry powder. The grinding is carried on by a rubbing or attrition action in ball, slug or rod mills and several types of product are prepared—one, 85% through a 200 mesh and one 99%—through a 300 mesh. Coarser bentonite is also shipped. Bentonite is not hydroscopic and has no tendency to take up any more water than any other finely ground materials. The chief physical characteristic of the Wyoming type is very small particle size and the shape of the particles.

The pyrophyllites are mined, crushed, pulverized, and sized by air separation; and the sericites and the chlorites are similarly mined and prepared for the market.

The attitude of American filler users with regard to American clays was that surely they could be used as a filler in paper (in fact in 1918 they were being used in pretty large tonnage), but they were hard to wet; they settled too rapidly; the particle size was coarse; but they had the advantage of lower cost except in

New England. Increase in the production of various rubber products resulted in an increase in a demand for kaolins and the first plant to produce American kaolins for rubber was located in Georgia. The American kaolin producer did not know the requirements for use as a filler in rubber, so the manufacturers of rubber were forced to build their own plant to prepare a kaolin that would meet with their requirements.

Paper Industry Largest Consumer

Certain textile industries had been using English China clays exclusively. The American kaolins were not sufficiently refined to meet with their requirements, so again the clay user was forced into the highways and byways searching for kaolins that would meet his requirements. An investigation by the writer of American kaolins for certain textile trades developed that some American kaolins were less oil absorptive than the English China clays; some were more absorptive; that certain American kaolins were lighter in color in linseed oil and did not require as much surface pigment as did the English clays; that certain American clays did not strike through the fabric, but tenaciously stuck to the fibres; that the built up filler and coats of kaolin applied to the fabric were smoother because of the finer particle size of the American clay; that American clays could be obtained with all the viscosity required in oil and casein and that less casein was required; that American clays could be obtained with less iron oxide, if they were properly prepared. Here in America were kaolins even superior in their physical and chemical properties to most English china clays for use in textiles and they could be produced and shipped to the middle west and to the East at a considerable saving in cost.

The paper industry uses the largest tonnage of the mineral fillers. Even newsprint is much improved by the addition of fillers, providing for the surface adsorption of colors and a means of reducing friction in the high speed presses. The newspapers of the future bid fair to be a galaxy of colors because of the wider use of fillers.

Filler clays should be free from grit in any form, as well as from mica. The iron and the titanium not in combination with the silica and the alumina should be eliminated in washing. The clay particle should approach colloidal fineness, and since these colloidal like clays are temperamental in that their physical property is altered even with the dispelling of hydroscopic moisture, there is nothing more important in the process of refining than drying. We know that while the retention of the filler in wood pulp depends on many factors, yet the particle size of the filler seems of all the most important.

Clays are widely used in paints and calcimines and an opportunity exists for a much greater use in this field. The opinion has naturally prevailed among the paint manufacturers that the kaolins could never be used extensively for exterior paints. The weather resisting properties of those paints composed largely of red and yellow ochres, which may carry as much as sixty to eighty per cent. of clay, is well known. Here the oxidation of the iron in the presence of linseed oil does not materially affect the color. Such fillers as whiting are affected much more rapidly by agencies of weathering than are the inert materials of which the clays are composed. Clays must approach colloidal fineness for use in paints, so that they will remain in suspension in oils. The colloidal-like kaolins are lower in specific gravity than clays of coarser particles. The oil absorption of fillers has an important relation to the weathering properties of paints. Both the kaolins and China clays have a high oil absorption when compared with most pigments, and manufacturers of certain paints object to them for this reason. Oil absorption naturally increases the weathering properties of paints.

The kaolins and China clays as fillers have a wide number of additional uses, as in plaster and plaster products; in the manufacture of crayons; toilet powders, for medicinal use; in soaps, etc.

1937 Consumption Breaks all Records

In 1937 the consumption of American kaolins and China clays broke all records, being about ten per cent. greater than in 1936, according to the U. S. Bureau of Mines. In 1936 the United States produced 638,939 tons, valued at more than four and a half million dollars at the mines. Georgia, as usual, was the largest producer, accounting for sixty per cent. or 419,395 tons. South Carolina produced twenty per cent. and Pennsylvania seven per cent., while about seven per cent. was produced by North Carolina, Virginia, Florida and California.

High grade talcs, like the Italian, have their greatest use in the manufacture of cosmetics. Here whiteness, fineness and shape of particle size and freedom from grit are of prime importance. As a filler in paints talc color should be good in oil, the oil absorption should be constant, the fineness should all be at least 300 mesh. Talc is used in considerable quantity in various grades of paper, and it is reported that the fibrous talcs as fillers give a very high retention.

Large increases in the use of talc are recorded in many pottery products to prevent crazing, to give a tougher body, and produce high electrical resistance in certain products. Textiles use considerable talc of good color and free of grit. Talc is also used as a filler in rubber, particularly mechanical rubber products and much is also used as a dusting agent for rubber.

While talc is now being used in insecticides, there is apparently a larger market ahead in this field. It has insecticidal value in itself by filling the breathing pores of many insects, but generally it is used as a carrier for derris, pyrethrum, nicotine, arsenicals, etc. In concrete, talc of fine particle size fills the voids in cement,

resulting in a denser, more waterproof product while it also gives greater plasticity, thus a more workable mix. It is also used in plasters where it provides greater workability and a smoother finish. A little promising work has been done on molding talc with other materials and subsequent firing for the manufacture of a variety of products.

Most talc is sold in pulverized form and the largest output is in New York, Vermont, California, North Carolina and Virginia, but it is mined and processed in many other states. In 1936 the United States produced 204,663 tons of pulverized talc, most of which was used as a filler, with a value at the mines of $2,193,073. There were imported 24,331 tons, valued at $456,667. These figures are not a fair indication of the value of talc as a filler, because it includes the value of such materials as pulverized soapstone often a by-product. Talc for the textile trade will usually average between $20-25 a ton and cosmetics will pay from $45.00 to $75.00 a ton for the better grades.

Water ground American whitings, made from very white marbles and crystalline limestones, are now being widely used very largely in rubber and paints. Precipitated calcium carbonate is used in the manufacture of the same products and as a filler for pulp and in newsprint.

The chief uses of Wyoming bentonite are for drilling muds to maintain suspensions and as a foundry sand binder. Bentonites are used in paints to facilitate suspension of filler pigments, and a tremendous variety of uses for the bentonites has developed as in cements, emulsions, soaps, insecticides, for the purification of water, etc. In 1936 production of the Wyoming type was 55,090 tons, valued at $520,852. Shipments of the Black Hills type of bentonite, also known as the Wyoming type, during the year 1936 were 73,378 tons. At least 80% of this was used for foundry work and oil well drilling muds. The use of the bentonites has practically all taken place since 1918, and a tremendous field of application looms in the future. Certain Fuller's earths, when treated with alkali, become similar in their properties to Wyoming bentonite.

The pyrophyllite of North Carolina is peculiar in that many physical properties are like talc, yet the chemical composition is like clay. Their production is included with that of talc. In most of these deposits the iron content is low, usually less than 0.5% and it is highly resistant to acids. It is being used in composition roofing, as a filler with asphalt and rubber and other materials, and it goes in increasing tonnage into the manufacture of pottery products.

The sericites and chlorites are confined almost exclusively in commercial production to Georgia. They are rock micas, which have the physical properties of both talcs and mica. They are now carefully mined and pulverized with air separation, and their physical properties make them of interest to many industries.

The utilization of wood flour[1] and the progress in that industry has been very gradual since 1918. The production has continually increased during the past two decades from the neighborhood of 10,000 tons in 1918 to between 45,000 and 50,000 tons in 1937. New uses have developed as a filler to give bulk to certain compositions, but there is little information available in the literature about these developments.

Since 1927 there has been a decided improvement in wood flour quality and specifications are more exacting. Finer and closer screen analysis, color, moisture content, absorption value, resin content, specific gravity and manganese content, all have to be considered in determining the value of wood flour today. In 1927 only several grades were made while in 1938 twenty or more grades of different qualities are produced.

The greatest progress made in the refining and application of fillers has been made in the clays, but the opportunities for the development of clays as fillers are even greater. While much progress has been made in the processing and use of other fillers, little has been done in comparison to what we already know can be done to increase the value of these fillers for the many new products which are being developed.

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[1] (Clay Refining By Flotation Methods by M. C. Shaw. Am. Ceramic Soc. Vol. 16, No. 7, July, 1937).

[2] (Asst. Sales Manager, W. H. Loomis Talc Corp.—Letter March 12th, '38).

[3] (U. S. Bureau of Mines—Report of Investigations, No. 3314).

[4] Letter from Mr. P. P. Bowen, Pres., Becker Moore & Co.

Industry's Bookshelf

Qualitative Chemical Analysis, 2nd edition, by Louis J. Curtman, McGraw-Hill, N. Y., 514 pp., $3.75. This well-known text has been extensively revised in order to incorporate modern theories concerning aqueous solutions. Its logical arrangement makes it suitable for use by industrial analysts as well as by students. A short section on semi-micro technique is included.

Introductory General Chemistry, 2nd edition, by Stuart R. Brinkley, Macmillan, N. Y., 731 pp., $3.50. This edition preserves the excellent arrangement of the widely-adopted first edition. The presentation of observed facts is followed by the correlating theory. Well-chosen illustrations and many references to industrial applications are included.

Solvents, 4th edition, by Thomas H. Durrans, Van Nostrand, N. Y., 238 pp., $5.00. During the five years since the third edition appeared there have been important developments in the lacquer field, particularly in the methods for producing and using solvents and plasticisers. The present edition incorporates these developments, the sections on plasticising solvents and on toxicity being entirely rewritten.

Modern Aspects of Inorganic Chemistry, by H. J. Emeléus and J. S. Anderson, Van Nostrand, N. Y., 536 pp. This comprehensive text emphasizes the physical and physicochemical aspects of inorganic chemistry. Written for the advanced student, it should stimulate a needed return to research in this important field.

Suggestive Use of Violet Ray Analysis

By Dr. Julius Grant

A NEW method of investigation has proved of value in practically every branch of science and industry, although the advantages it offers in the fertilizer and allied industries are at present not so well-known. It depends on the fact that when many substances are observed in ultra-violet light, they emit a characteristic glow or fluorescence. This is used to identify the substance responsible for it, and even to enable the amount present to be estimated.

It is little use to rely on the sun as a source of ultra-violet light for fluorescence work, even in parts of the world where it is not fickle. It is preferable to use one of the many convenient lamps now on the market. These are made of quartz, which is more resistant to heat and more transparent than ordinary glass, and they contain mercury through the vapor of which is passed an electric discharge. This discharge is very rich in ultra-violet radiations. In some cases the mercury vapor is produced by heat; in others the electrodes are coated with electron-emitting salts of the rare earths, and these, in conjunction with a trace of a rare gas as activator, enable the mercury arc to be produced by the turn of a switch and without any auxiliary process.

Such lamps may be plugged into a socket of the ordinary electricity supply, and they are relatively cheap to purchase and operate. They do, however, generate a good deal of visible light as well as the invisible ultra-violet light. This must be removed, or it will mask the fluorescence of the object under observation, as the visible light from the sun masks the fluorescence produced by the invisible ultra-violet light it also emits. Filters made of a glass containing nickel oxide serve this purpose effectively, and they are frequently incorporated into the lamp itself. Such a filter appears almost opaque to the human eye, showing that it does not transmit visible light; it has, however, a high degree of transparency to ultra-violet light.

One novel application, already used with success, is to determine the uniformity with which a fertilizer is distributed over a given area. The fertilizer is first mixed well with a substance which fluoresces vividly in ultra-violet light. Anthracene is quite suitable and the amount need be only a minute fraction of the total fertilizer so long as the mixture is a thorough one. The fertilizer is then applied in the usual way, and at the end of the operation samples of soil are taken from various parts of the field and examined in the dark under the ultra-violet lamp. The anthracene fluoresces and appears as bright-colored spots, the number and distribution of which correspond exactly with the amount and distribution of the fertilizer in the various parts of the field.

The method has also been used quite successfully for identifying and controlling the qualities of many types of fertilizers. Samples of manure for example, which have been used for purchasing purposes, may be compared in this way with the bulk as delivered, and an idea as to uniformity and quality so obtained. This applies particularly to artificial manures, which frequently contain substances having a characteristic fluorescence.

Fertilizers having a phosphatic basis lend themselves particularly well to this examination. In some cases it is possible to glean information as to their nature and origin. Most phosphates fluoresce to some extent, although the exact nature of the fluorescence differs according to the locality from which the material comes, the other substances it contains, and so on. Such fertilizers may, however, be distinguished from the slag from the Thomas process ("Thomas meal") which has little or no fluorescence. Bone meals have a very striking vivid blue fluorescence similar to that of the human teeth. They are therefore, quite unmistakable, and as the color varies in shade of blue according to the fatty matter present, this also is an aid to identification and control. On the other hand, superphosphates and di-calcium and tri-calcium phosphate also fluoresce, although only with a dull violet color.

The approximate compositions of mixed fertilizers in various proportions may therefore be judged by making up synthetic mixtures of known compositions, to find which most closely matches the unknown mixture in ultra-violet light. This approximately quantitative method has enabled 10 per cent. of certain types of raw phosphates (e.g. from Florida) which have a brown or yellow fluorescence, to be distinguished with ease in basic slags. Some workers prefer to extract the samples with water and to examine the extracts, instead of the solid slags. Others favor a 10 per cent. solution of hydrochloric acid as extracting agent. One advantage of extraction methods is that organic matter (and especially traces of lubricating oil from grinding machinery) may be present in the sample, and as these sometimes fluoresce markedly, they vitiate the results. They are, however, eliminated to a great extent by extraction. It is as well therefore, to judge each case on its own merits and to formulate the testing method accordingly.

Numerous other applications to agricultural problems exist (cf. Radley and Grant, "Fluorescence Analysis in Ultra-Violet Light," 1935). Seeds in particular have proved very fruitful. Seeds which contain oils (e. g. linseed) or starch (e. g. peas, barley, etc.) fluoresce particularly vividly, and the presence of incipient mould-growth or other deteriorative agents is indicated by a modification in the nature of the fluorescence. The constituents of poultry-food mixtures and other mixed grists for instance may be identified, and the approximate quantitative method outlined above may be applied also in many such cases.

Powers Behind the Throne

Happy the executive who has the invaluable assistance of an efficient secretary. Within their own organizations they are known and properly valued, but to the world at large they are too often a pleasant voice on the telephone or a set of initials at the bottom of correspondence.

Miss Helen Redfield who greets the callers at Dr. William M. Grosvenor's laboratories in the Chemists' Club Building, New York.

Mrs. C. M. Browne, secretary to the manager of the chemicals division of the American Agricultural Chemical Co., George E. Riches.

In Cleveland, the office of Henry L. Grund, distributor of chemical raw materials, is in the capable hands of Mrs. Mira Hamilton.

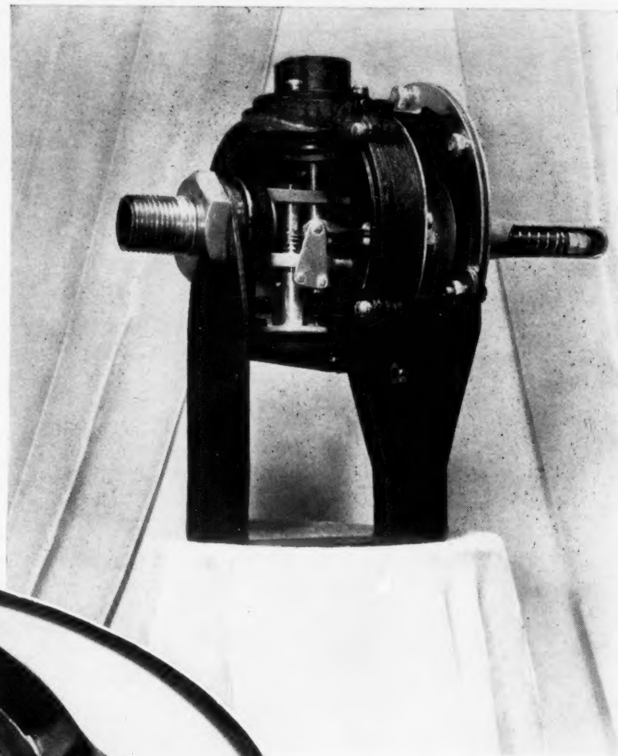
Miss Mariet Miller performs similar arduous duties for that veteran jobber of gums and waxes, Fred L. Brooke, Chicago.

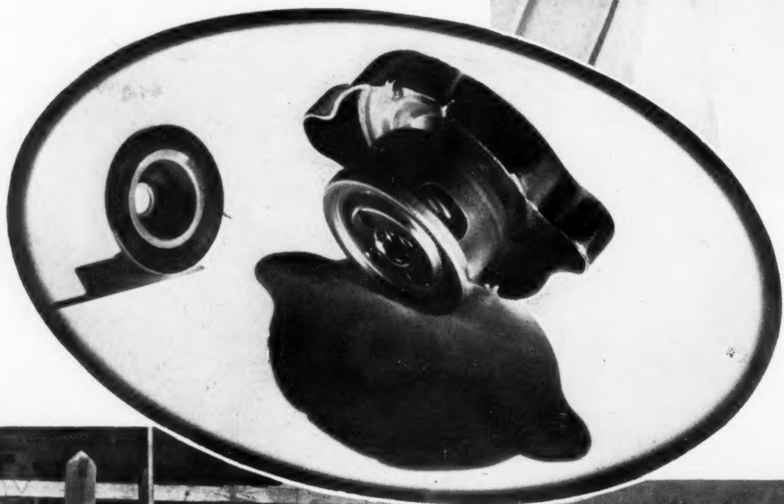
In that vast chemical hive, the du Pont Building, Wilmington, the sales manager of the R. & H. Chemicals Dept. Charles Wiswal's secretary is Miss Thelma Graef.

NEOPRENE

in the Plant-

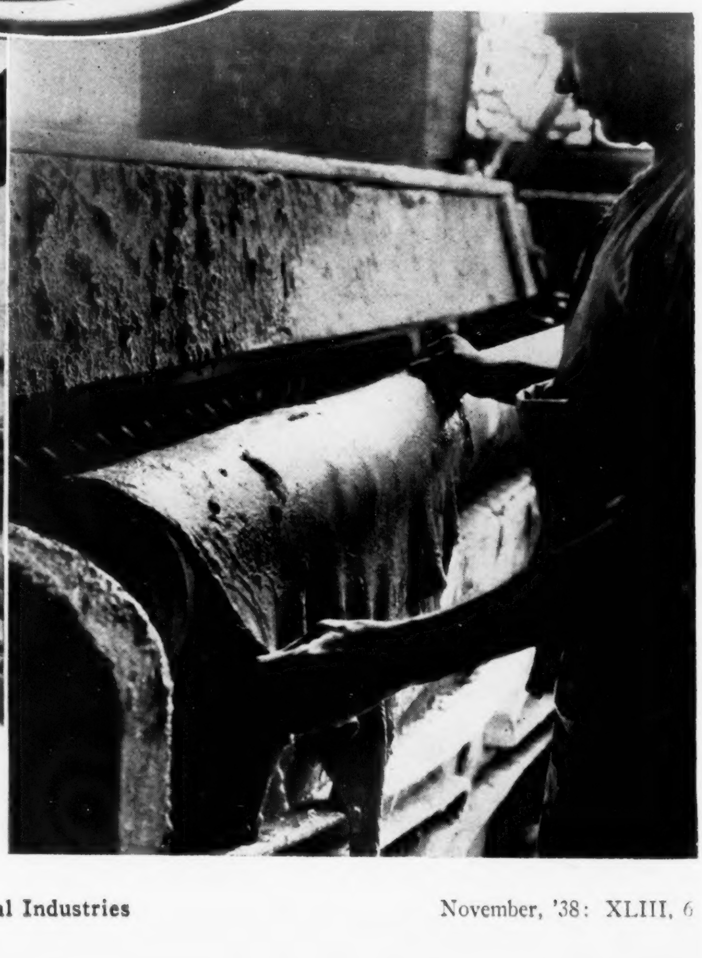
The industrial applications of neoprene illustrated on this page are widely spread in their fields of use and service. (See story on page 481, this issue.) Another important adaptation in the industrial field is its use in textile machines where resilient spinning cots are used to guide thread. In this case the cots are made from neoprene which resists the action of the dyes and the oil of the thread. In the oval is an example of its use in the automotive field. This protective radiator cap employs a neoprene seal as shown at the left so that the user of the car can be certain of long, trouble-free service.





Diaphragms are an important outlet for neoprene compositions. This brake conversion cylinder uses two. Below, most severe operating conditions must be met by the furnishing roll in a tannery. The roll shown here made from neoprene has met these requirements.

In drilling many oil wells, oil under pressure is forced down into the well to wash out the chips which are cut, passing through valves made of resilient material to obviate cutting. Workmen are installing neoprene valves to resist destructive action of certain fluids and oils.



and in the Home

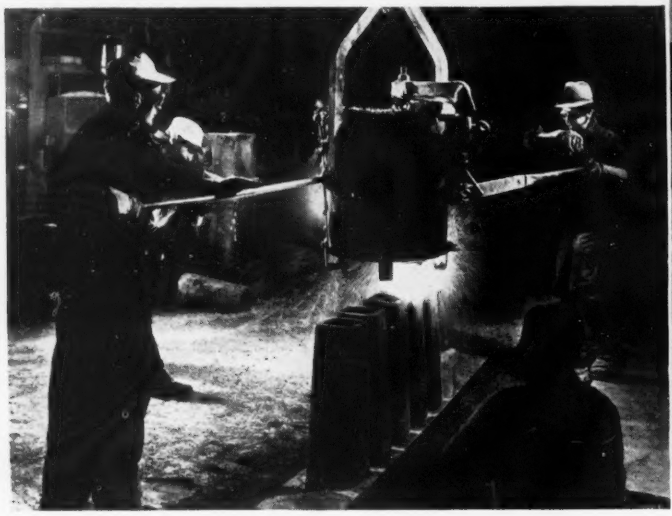
A boon to the housewife is the never-ending parade of household items manufactured from neoprene. These products are not only easier to handle, but give longer service and greater satisfaction to the user. For pharmaceutical purposes a neoprene dropper bulb has been developed, which resists the deterioration caused by the rapid attack on the usual rubber bulb by the vegetable oil used as a base. In the photograph below, the bulb shown in the lower right-hand corner is a unit atomizing spray which is filled with an oily solution and is used by hay fever victims. The two tubes in the center front have neoprene pistons. A drop of oil is placed in the grooves of these pistons to insure that they will not stick. Such neoprene parts also resist the effect of any oily solutions placed in the tubes.

This dropper bulb has an atomizing tip which makes it possible to inject nose drops without tilting the head to an uncomfortable position. The tip is made of neoprene.

The usual rubber household glove is subject to attack by cleaning fluids, soaps, and similar substances used by housewives. These neoprene gloves were made to give long service under difficult conditions.

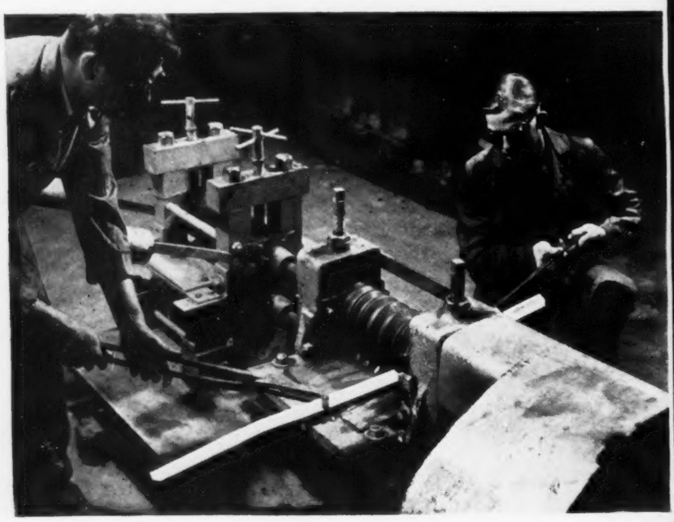
Miniature Steel Making

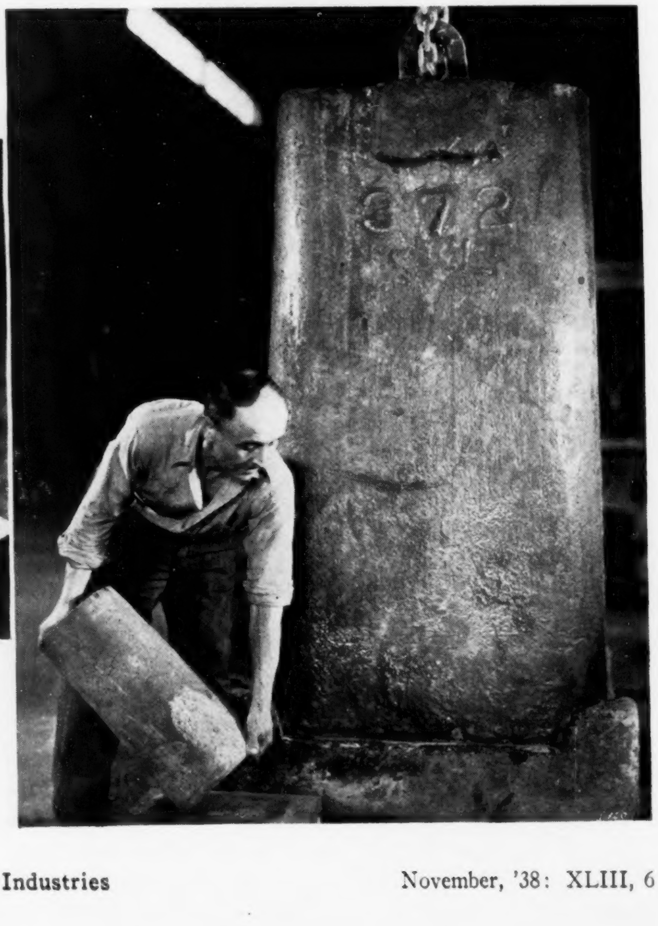
A unique approach to research is being made through use of a miniature steel plant installed in the new research and development laboratory of Jones & Laughlin Steel Corp. in Pittsburgh. Here steel making facilities such as an open hearth furnace, heat treating furnaces and rolling mills of pilot plant size are used in conjunction with extensively equipped chemical, physical and metallographic laboratories for solving problems of steel quality, and to investigate the various methods of steel making on a basis that enables ready application of new and improved practices in the big furnaces and mills of the production departments.



Tapping the small open hearth furnace which has a capacity of 1500 pounds and parallels conditions in the company's big steel furnaces. It is a recuperative and not a regenerative furnace, and features an unusual type of burner. This new type of furnace construction may be applicable to open hearth furnaces used in actual production.

Steel made in the open hearth is carried in the small ladle shown above to the ingot molds and "teemed" into ingots. These laboratory ingots are rolled in the pilot plant, or, in some special cases, are rolled into various products on equipment in the regular mills. Below, this small, two-high mill, which stimulates conditions in a billet mill, will reduce a $1\frac{1}{4}$-inch square to $\frac{1}{2}$-inch square. The products of this mill are also tested in the physical and metallographic laboratories nearby.





Right, this small mold of the big-end-down type is being held by the workman for comparison with the large mold which is one of the sizes used in the steel works at Pittsburgh and Aliquippa.

Plant Operation and Management

A digest of new methods and plant equipment

The Trend of Chemical Engineering

By Dr. W. M. Cumming and F. Rumford, B.Sc.

THE metallurgist continues to supply an increasing range of new metals and alloys with remarkable mechanical and corrosion resistant properties. The recent improvements in refractory products and the outstanding developments in the field of plastics and other organic products, have provided for the chemical engineer materials unique in their extensive application. And in spite of it all there is as yet no clear idea of the causes of corrosion, the effects of which still constitute his major problem.

Cast iron is still our most important material of construction of chemical equipment, and that its position has been maintained is in no small measure due to the great improvement which has taken place in foundry practice within recent years, resulting from closer metallurgical control. There has been marked improvement in its uniformity, homogeneity, soundness, and mechanical properties, due to freedom from gas holes, draws, and shrinkage cavities. The result has been a cast iron much more resistant to corrosion. The production of special cast irons, in which varying amounts of other metals such as Ni, Cr, Mn, Cu, Al, Mo are added, is now an important industry providing the chemical engineer with materials which, because of their austenitic structure, offer considerably increased resistance to chemical reagents.

It is less than 10 years since Hatfield introduced us to the acid-resisting steels of the austenitic 18.8 chromium-nickel type. The development of chrome steels in America has run parallel with that of the 18.8 steels in this country. It is interesting to note that in the pressure oxidation of ammonia to nitric acid, chrome steels are employed for the most important units of the plant in the U.S.A. Hatfield's well-known paper of 1929 gives a full account of the fabrication of plant in stainless steel, and a list of the chemical reagents to which it offers resistance. Its most important industrial application is, of course, in the manufacture of synthetic nitric acid from ammonia. This pioneering work, however, was only the beginning of greater achievement. By the addition of small percentages of other metals, e.g., titanium, molybdenum, and tungsten, the steel could be made more resistant to specific media (e.g., acetic acid, sulfuric acid); it became almost immune to inter-crystalline corrosion, and permitted of welding without the necessity of subsequent heat-treatment. The 18.8.1.1 steel is the latest addition to this category.

One outstanding development in the use of these special steels is for high-temperature—high-pressure reactions, resulting from an appreciation of the importance of creep at elevated temperatures. For example, the addition of 0.35 per cent. Mo to ordinary steel increases its creep strength at 450°—550° C. by 100 per cent., while for high pressure above 525° C. the austenitic steels prove satisfactory on account of their excellent creep properties.

As in the case of the acid-resisting steels, the addition of small percentages of other metals confers additional advantages where corrosive conditions are present. Especially is this the case in their resistance to hydrogen attack, resulting in decarburization and fissuring. Chromium, tungsten, and vanadium materially increased the resistance, while other elements such as niobium, tantalum, titanium, zirconium, and thorium, which form stable carbides, have also been proposed.

There is a growing tendency to appreciate the importance of a knowledge of the mechanical and crystallographic properties of lead. Failure has often been due to mechanical breakdown before serious corrosion effects were noticeable. A fine grain structure has been established as necessary where the maximum corrosion resistance is concerned. While it is still doubtful as to the advantages of small additions of copper and nickel, tellurium in less than 0.1 per cent. offers marked improvement in property. The last mentioned gives a finer grain structure than either copper or nickel; it raises the temperature of spontaneous crystallization so that the lead can be cold-worked; in addition the lead becomes markedly more resistant to corrosion.

The use of homogeneously lined lead vessels is on the increase. These linings can now withstand temperatures close to the melting point of the lead, and vacuum and pressure up to the limits of the base metals. It would be of interest to know whether tellurium lead has been applied in this manner, and if so, with what results.

There has been an enormous demand in the U.S.A. within recent years for copper and its alloys, particularly in the brewing industry. The addition of 15 per cent. zinc gives resistance to most acid and salt solutions superior to that of the bronzes, while the latter, when aluminum is incorporated, are finding applications where strength and resistance to abrasion as well as corrosion are required. For handling hydrochloric acid of all strengths in the cold and up to 20 per cent. at 150° F. in the absence of air and steam, the alloy containing 1 per cent. to 5 per cent. silicon and 1 per cent. to 2 per cent. manganese, tin, or iron is noteworthy. A new alloy containing 4 per cent. nickel and 4 per cent. aluminum, introduced two years ago, gives excellent service in condenser tubes where impingement attack is common. It shows special resistance to sulfur, and its application in heat exchangers and condenser tubes in the oil industry will doubtless follow on an extensive scale.

The film of oxide to which aluminum owes its corrosion resistance has been decreased in permeability by impregnating the coating with corrosion-inhibiting substances, and has been artificially produced in a tenacious form by several well-known processes. An otherwise highly reactive chemical element has thus been made available in increasing quantities for the construction of chemical plant, in particular for handling synthetic nitric acid, anhydrous sulfur dioxide, gaseous and liquid ammonia, and acetic acid, and for the manufacture of varnishes and fatty acids, and over a wide range of the foodstuffs industry. The rapid attack of aluminum by alkaline liquids, halogen and halogen acids, still calls for attention.

The use of chemical stoneware in the manufacture of the strong mineral acids would appear to be again on the increase. The elimination of metallic impurities is extending its use in the fine chemical industry. For use in processes, such as sublimation under reduced pressure, its low coefficient of expansion has resulted in its displacing glass in some cases.

* Papers presented at the Autumn Meeting, Society of Chemical Industry, at Glasgow, September 17 and 19, (abstracted from *Chemical Age*, Oct. 1, '38, p. 253).

Increasing interest is apparent in rubber, due no doubt to the satisfactory results which have already been obtained in its use. Like wood, this material is subject to the limitations of an organic product. Its use as a protective lining will always have attraction for the chemical engineer, who now appreciates the importance of suitable design and the proper surface treatment of the metal to which it is to be applied. The importance, however, of eliminating porosity in the original metal cannot be over-emphasized. Little is heard of the practical applications of rubber latex for linings, owing no doubt to the difficulties inherent in such obviously attractive processes as electrophoresis.

The Paint Research Association continues to concentrate attention on the basic principles underlying the protection of metallic surfaces by means of paint. The nature of film failure is more clearly defined. The importance of paints containing synthetic resins, particularly of the Glyptal type, and chlorinated rubbers, such as Neoprene, is being increasingly recognized for specific duties, the former in the oil industry, the latter in the preparation of special anti-corrosion paints. It is of interest to record that enamel surfaces resistant to alkali are now available.

It is being increasingly realized that a full understanding of the basic principles underlying any chemical process is vital to proper plant design. For instance, it is useless to design a plant for the manufacture of sodium thiosulfate crystals of a specific size range on the basis of heat abstraction alone. It is necessary to preserve a balance between cooling and crystallizing rates, and this leads to the concept of a "surface factor" specific to a certain size range of crystal. This surface factor really controls the output of the plant, and rates of cooling must be modified in accordance therewith.

Heat transfer has been exhaustively studied in the hope of deriving general formulæ, and overall heat transfer coefficients of an empirical nature are being slowly replaced by composite figures derived from film coefficients. These film coefficients have been, and are being, exhaustively studied in the hope of deriving general formulæ of the dimensional type. It may be said, however, that so far these formulæ have only a very limited application.

In the unit operation of filtration, or the separation of solids from liquids, the main types of filtering plant have been well established for some time, and, failing some altogether new development in this field, it is probable that attention will more generally be paid to the preparation of the slurry before filtration, and improvements in the actual plant will be confined to details. Investigations have been proceeding into the behavior of typical slurries with a view to determining the nature of the so-called "compressible" filter cakes. It is possible that this may be extended into work on the actual formation of precipitates, and attempts made to produce all solids in a form which will render filtration straightforward. At present filter aids are being widely employed to this end, and the working of the enormous deposits of diatomaceous earth in America for this purpose is developing rapidly.

Most slurries in heavy chemical works practice can now be converted to a form suitable for handling on a rotary vacuum filter, and even by a system of counter current decantation, freed from soluble matter before passing to the filter. For bulk filtration of materials which are not highly corrosive, the rotary vacuum filter is tending towards almost universal use. In this connection it is of interest to note that the release of gases from the filtrate may seriously interfere with the rate of filtration.

Improvements in this type of vacuum filter have centered upon discharge of cake and on washing of the formed cake. Endless string belt discharges are now common, while some makers have incorporated a sponge rubber backing to the filter cloth, collapsing under vacuum, but expanding at the point of cake discharge. Washing has never been very satisfactory on these continuous units, and it is now common practice to remove the filter cake and to repulp with wash water, passing this slurry to another filter. The disc type of rotary vacuum filter, despite the saving in floor space over the simpler drum type, seems to be falling into disuse, owing to difficulties in the washing and discharge of the solid.

The plate and frame, or recessed plate, filter press has not been substantially modified for many years, and is still undoubtedly the most widely used of all types of filtering equipment.

There is still an enormous discrepancy between the amount of work theoretically required to crush solids and the amount actually used. In view of this, it is not to be expected that crushing and grinding plant has nearly reached finality in design. It is probable that crushing by direct compression is most economical of power, and for this reason the so-called coarse crushing units may be the most efficient on a theoretical basis. Cone crushers are now made to secure reduction to about 20 mesh, and probably give crushing by direct compression. Ball mills are being more closely studied with a view to diminishing wear on the liners, while at the same time maintaining grinding efficiency. There is a growing tendency to make mills of greater length, and the original Hardinge shape, in particular, has been modified to give a longer center section.

It is being realized that the grinding characteristics of a given solid can be altered by the addition of certain reagents. In dry grinding, coating of the grinding units can be prevented, while in wet grinding aggregates are dispersed. It may be that, as in filtration, further work will be directed towards such treatment of the material rather than the improvement of the equipment.

The problems of fractional distillation still receive much attention. Since the introduction by McCabe and Thiele of the graphical system for representing the work of a fractionating column, a number of figures have been obtained for a plate efficiency as compared to a perfect theoretical plate. It is now being realized that this ideal plate cannot actually exist owing to the concentration changes which occur in both liquid and in vapor phases. It has been shown mathematically that efficiencies of 200 per cent.-300 per cent. are quite possible, and figures of 100 per cent.-150 per cent. are frequently obtained in practice, even with quite small columns.

The influence of entrainment has been investigated and shown to be fairly small in comparison with the economies to be effected by higher vapor velocities. This has been carried to its logical conclusion by the construction of a column in which complete entrainment takes place in each section followed by a liquid separating device. The use of a spiral rotating at a high speed has been suggested as a means for providing a long countercurrent path for vapor and liquid. Developments on these lines may lead to a very compact distillation system, as vapor velocities up to 75 ft. per sec. have been suggested.

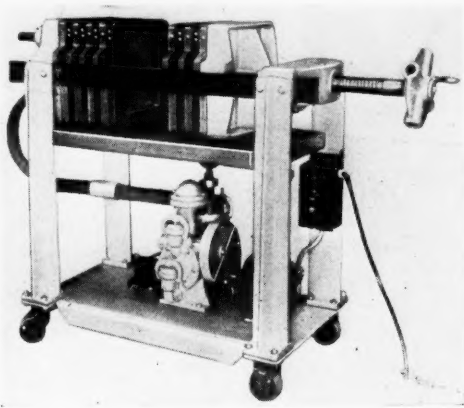
Although very large quantities of crystals are still made direct in a salting type of evaporator, special crystallizing units are becoming more common. With a better knowledge of the underlying theory of the growth of crystals, these units are now designed to make a very even grade of product. There is still much, however, to be learned in this field from a physico-chemical standpoint. It has been shown only recently how traces of metal salts affect the crystalline form of ammonium sulfate, and many other such phenomena may exist. The rocking and the stirred type of crystallizers are now faced with competition from evaporative cooling plants working under vacuum.

In the field of drying equipment, it is noticeable that of recent years there has been a tendency to install equipment which takes solutions down to solids of any degree of dryness. The drum drier, usually of the double-drum type, is a case in point. It is doubtful, however, whether these driers are economical unless they are large enough to justify constant supervision. Spray drying also is gaining in popularity, and a number of plants are now in operation. It is a drawback to this type of plant that so large a chamber is required for a comparatively small throughput, but this failing is likely to be a permanent one.

New Equipment

Corrosion Filtering Medium

A compact filter unit developed for filtration of certain corrosive chemical solutions which are injurious to or are contaminated by metals, is announced by T. Shriver Co., Harrison, N. J. The operating mechanism of the filter is made of semi-hard rubber. The particular unit illustrated consists of alternate filter plates and frames, 12" square, assembled on side bars to make a 6 chamber filter with a total filtering area of 5.5 sq. ft., and a conservative filtering capacity of 135 gals. per hour. Increased filtering capacity may be accomplished by adding plates and frames to increase the number of filter chambers at an increased rate of 20 to 25 gals. per chamber. The plates may be clothed with cotton twill, wool, or glass cloths depending on the nature of the solution to be handled. In order to facilitate cleaning, filter paper may be placed over the cloth, thereby permitting quick and easy stripping of the paper together with the solids in the filter frame from the cloth, and re-covering with fresh paper. The entire opening, cleaning and closing procedure is thus accomplished in minimum time. The filter is fed by a Shriver Duplex Diaphragm Pump with rubber lined liquid ends, valves, feed and discharge with rubber hose connection to the filter. The pump is direct connected to a ¼ H.P. standard motor.



Glass Fibre Gasket

A woven glass fibre gasket for acid-resistant seals in chemical work, which is soft, pliable, resilient and resistant to all acids except hydroflouric acid, is being manufactured by the Goetze Gasket & Packing Co., New Brunswick, N. J. Company believes these glass fibre gaskets will be a revolutionary solution to many industrial problems. Packings made from this same material have been designed for use on centrifugal and reciprocating pumps, valve stems, etc., glass fibre having definite advantages over blue asbestos formerly used for such services, as it is even more highly acid-resisting and non-abrasive.

Condensers For Acid Vapors

A highly efficient condenser for corrosive vapors, especially those containing hydrochloric or hydrobromic acid, has been developed by Fansteel Metallurgical Corp., N. Chicago, Ill. Unit consists of a tapered tantalum tube in a steel water jacket, and condenses 90 gals. of hydrochloric acid per hour under a 28-inch vacuum. The unit, which is operated in a vertical position, stands 8 feet high. The maximum inside diameter of the tantalum tube is 6 inches, and the smallest diameter 2 inches, which is also the inside diameter of the straight section. This type of tantalum condenser is suitable for all types of condensation operations, including vacuum, atmospheric or higher pressure, fractional or reflux operation. When used in a vacuum system or with vapors containing non-condensable gas, the condenser is filled with suitable packing material.

SO_2 Recording Equipment

Cell corrosion and acid mist, former obstacles to successful SO_2 measurement, are eliminated in the new Micromax recording equipment made by Leeds & Northrup, 4934 Stenton Ave., Phila. With it, accurate and reliable records are now being obtained. Using a standard, glass, measuring-cell assembly, in which corrosion and catalytic action are definitely avoided, it holds its calibration continuously. Sulfuric acid mist, a former cause of calibration errors, is removed by an efficient filter. Cell assembly operates for weeks without attention. Changes in humidity no longer affect calibration . . . lag is minimized, as it is now possible to draw the continuous gas sample from the flue immediately after it leaves the burning chamber. Freed of sulfuric acid mist and SO_3, the gas is easily measured with the improved thermal-conductivity equipment long known to be basically sound and already used so successfully in the measurement of CO_2. The circuit is operated entirely by alternating current without batteries, rectifiers, etc.

Acid Carboy Lifter

A new-type lifter, designed specifically for the hazardous job of handling and dumping acid carboys, is announced by Service Caster and Truck Co., Albion, Mich. Machine is hand-powered and equipped with lifting arms which descend all the way to the floor. With lifting arms fully lowered, the heavy carboy is securely fastened in a cradle, a flat, 18 x 20" steel plate with clamps at top and sides to bind the carboy in position. A few strokes of a convenient handle raise the arms to the desired height, then a small hand crank rotates the carboy into position for dumping. To lower, operator merely pulls a small handle connected to a hydraulic unit and the arms cradling the empty jug sink gently to floor level. The entire unit is easily moved about, can be rolled to the side of tank or vat. Floor locks on the rear wheels prevent it from moving while in operation and wide-spaced wheels at base contribute utmost stability. Built on special order for any capacity and with electric motor if so specified.

Electric Drying Unit

Marked improvement is promised in centrifugal drying of metal products and parts by a new development in the Mercil type centrifugal dryer made by Hanson-Van Winkle-Munning, Matawan, N. J. The newly constructed dryer includes a Garden City blower, direct connected to a ¼ H.P. motor. A 6" pipe line is welded to the cover and extends over to the blower to a point where it can swing out in a horizontal position. The cover is simply lifted and swung out of the way in order to load and unload the basket of work. Electric heating elements are inserted in the pipe line directly above the opening in the cover. The effect of this combination of Mercil Dryer and electric drying unit is to dry a batch of 30 to 60 lbs. of small work in one or two minutes. An interesting feature of this unit is the absence of vibration, even with the loaded baskets spinning at 600 R.P.M.

Respirator For Organic Vapors, etc.

A rubber constructed respirator has just been perfected to protect the lungs of those who must work where injurious gases and fumes prevail. It is a twin filter type respirator equipped with twin cartridges of special charcoal for organic vapors, soda lime for acid gases and copper sulfate for ammonia gas. Cartridges are easily removable and quickly replaced by new ones whenever desired. Air filter apertures have been placed back at cheek location for perfect distribution of its exceptionally light weight. Exhalation valve has been located close to mouth for positive elimination of breathed air. The trade name is DUPOR No. 10, made by H. S. Cover, South Bend, Ind.

Booklets & Catalogs

How to get these booklets: Companies will be glad to supply copies free, provided "Chemical Industries" is mentioned and the request is made on company stationery. Your business title should also be given.

Armored Floors for Chemical Plants, Bulletin, describes Snead Armor Grids said to permanently and economically protect against wear and deterioration, floors, etc., and areas exposed to moisture and chemicals; of interest to plant managers annoyed with frequent production delays and costly repair bills caused by poor floors. Snead & Co., 121 Pine St., Jersey City, N. J.

Bakelite Review, October, 1938, features "Plastics in Playland" and numerous other fields into which use of molded plastics is rapidly extending. Bakelite Corp., 247 Park Ave., New York City.

Ceramic Forum, Aug.-Sept., 1938, feature "Processing of Acid Resisting Enamels." Ceramic Forum, 209 Fourth Ave., Pittsburgh, Pa.

Chemical Pumps and Proportioners, Bulletin No. 938, on improved models of single and multiple unit motor pumps for pumping any type of chemical in exactly the desired volume against pressures ranging from 0 to 15,000 lbs.; describes outstanding features of design construction, and gives specifications on 172 pumps and sizes. Milton Roy, 2031 E. Madison St., Phila., Pa.

Chemistry and You, Vol. 15, No. 4, money-making ideas for users of chemicals straight from the laboratory. Arthur R. Maas Chemical Labs., 308 E. 8th St., Los Angeles, Calif.

Convection Furnaces, for ferrous and non-ferrous metals, Brochure outlines advantages of convection heating; gives operating data; illustrated. Surface Combustion Corp., Toledo, O.

Diesel Engines, Catalog Form 10110, on Type S, a heavy-duty, continuous-service compact engine for stationary or marine-electric application; many illustrations of engine parts, explaining relationship of their design to the economical installation and operation characteristics of the unit; specifications and dimensions included. Ingersoll-Rand Co., 11 B'way, New York City.

Du Pont Magazine, October, 1938, feature article "The Steel Industry—A Glimpse into its Past, Present, and Future"; brings reader to date on latest du Pont developments. E. I. du Pont de Nemours & Co., Wilmington, Del.

Durez Molder, September, 1938, latest developments and trends in plastics manufacture discussed and illustrated. General Plastics, Inc., No. Tonawanda, N. Y.

Dutch Boy Quarterly, Vol. 16, No. 3, feature "The Why of Red Lead Paint," also "How to Paint Brick," including formulas for coatings. National Lead Co., 111 B'way, New York City.

Electrically Heated Kettles, leaflet, covers line available for every requirement of industry; details of construction outlined and illustrated. Patterson Foundry & Machine Co., East Liverpool, O.

Electromet Review, October, 1938, interesting compilation of newer adaptations of alloy steels and irons; illustrated. Electro Metallurgical Co., 30 E. 42 St., New York City.

Equipment for Pulp and Paper Mills, Bulletin—Form 2273-A, illustrated in this bulletin are such diverse types of equipment as pumps, compressors, pneumatic tools for construction and repair work, condensors, diesel engines, refrigerating units, and vacuum pumps. Ingersoll-Rand Co., 11 B'way, New York City.

Facts About Shipping Boxes, booklet, practical information and fundamental facts for buyers of corrugated shipping boxes; six types of material made by H. & D. for this purpose described and illustrated. Hinde & Dauche Paper Co., Sandusky, O.

Filter Paper, booklet, announces Shark Skin brand, for industrial use; gives comparison tests with usual grades; uses, prices, and samples. Carl Schleicher & Schull Co., 167 E. 33rd St., New York City.

Functions of Sales Executives, carefully gathered results of a special study of the sales practices and experiences of 120 manufacturing companies; brings to the fore many important trends in the field of sales management; scope of these functions discussed under 4 general divisions—1, sales program; 2, the product; 3, market and outside factors, and 4, the sales organization. For copy address Policyholders Service Bureau, Metropolitan Life Ins. Co., 1 Madison Ave., New York City.

H-O-H Lighthouse, October, 1938, feature "Paper Mill Waters." D. W. Haering & Co., 3408 Monroe St., Chicago, Ill.

Heavy Duty Portable Vacuum Cleaners, Bulletin No. A-303, deals briefly with nature of dust hazards and practical considerations involved in planning a dust removal system; much practical working information is furnished for adapting vacuum cleaning to many varied industrial uses; illustrated. United States Hoffman Machinery Corp., Air Appliance Division, 105 4th Ave., New York City.

Insulag, Bulletin No. 3270, a refractory lagging which has proved highly successful in a wide range of installations; complete summary including description, properties, uses, charts and illustrations. Quigley Co., 56 W. 45 St., New York City.

Measurement and Control of Temperature, Bulletin M-382, covers indicating and recording types; also instruments for physical testing of paper; descriptions, uses and illustrations. Thwing-Albert Instrument Co., 3339 Lancaster Ave., Phila., Pa.

Mechanical Topics, Third Quarter, 1938, technical data, newer developments, and discussions of mechanical problems encountered in use of nickel, Monel and High nickel alloys. International Nickel Co., 57 Wall St., New York City.

Microtomes and Accessories, Catalog D-16, complete line described and illustrated, construction features, specifications; Price List as of August 1, 1938, included. Bausch & Lomb Optical Co., Rochester, N. Y.

Neoprene Notebook, September, 1938, feature article "Degree of Saturation of Petroleum Hydrocarbons Important Factor in Oil Resistance"; engineering problems discussed. E. I. du Pont de Nemours & Co., Wilmington, Del.

New Wrinkles in Finishing, No. 2, Vol. 1, feature: "7 Ways New Wrinkle Reduces Manufacturing and Finishing Costs"; also contains another timely article on "New Wrinkle Gives New Sales Appeal to Low Temperature Dried Products." New Wrinkle, Inc., Mutual Home Bldg., Dayton, O.

Nickel Steel Topics, October, 1938, feature "Nickel Steels in Marine Service." International Nickel Co., 67 Wall St., New York City.

Oxyacetylene Tips, October, 1938, leading article reviews briefly problems of fire prevention and safe practices in welding and cutting, the installation and operation of equipment, and storage and handling of oxygen and acetylene cylinders. Linde Air Products Co., 30 E. 42 St., New York City.

Packomatic, October, 1938, latest information on packaging equipment and methods. J. L. Ferguson Co., Joliet, Ill.

Petroleum Transportation, Storage, and Marketing, third of 3 charts depicting fundamental operations of petroleum industry; in two sizes —wall size and small size; copies of large chart available at 5c each; small charts gratis in limited quantities—1c each for large quantities. Apply to Dept. Public Relations, American Petroleum Institute, 50 W. 50 St., New York City.

Photrix Universal Photometers, Catalog, on Model A, useful data and information, stressing the sensitivity of these instruments, their adaptations in industry, dimensions, and prices. Dr. F. Loewenberg, 10 E. 40 St., New York City.

Piston Rings, Bulletin No. 385, announces new development in piston ring manufacture, making available rings having the wearing surfaces electrically coated with a tin base bearing metal to meet the demand of builders and operators of industrial size engines and compressors for a non-scuff, quick-seating piston ring; system is named "Tinized." C. Lee Cook Mfg. Co., Louisville, Ky.

Portable Indicating Potentiometer, Bulletin MF 763, describes new instrument for testing and standardizing service instruments and thermocouples; stresses value of light weight of the portable pyrometer; explains usefulness of instrument for temperature measurement, for checking calibration of potentiometer-type and millivoltmeter-type direct-reading instruments; illustrated. Foxboro Co., Foxboro, Mass.

Price List, industrial chemicals, October 15, 1938. J. T. Baker Chemical Co., Phillipsburg, N. J.

Price List, October, 1938, Mallinckrodt Chemical Works, St. Louis, Mo.

Price List, roster of industrial chemicals handled by company, also names of companies for whom company acts as distributor. Rolls Chemical Co., 477 Ellicott Sq. Bldg., Buffalo, N. Y.

Price List-Catalogue, Sept.-Oct., 1938, Magnus, Mabee & Reynard, 16 Desbrosses St., New York City.

Properties and Uses of Inconel, Bulletin T-7, revised edition, in which text has been rearranged, many parts rewritten, and more comprehensive data included. International Nickel Co., 67 Wall St., New York City.

Quarterly Price List, October 1938, of industrial chemicals made by R. & H. Chemicals Dept., E. I. du Pont de Nemours & Co., Wilmington, Del.

Remote Measurement and Control, Bulletin No. 227, describes new pneumatic transmission system said to be of particular value to oil refineries, chemical plants, and other industries where explosion and fire hazards are present and where flexibility of air operation is desirable; illustrated; a schematic drawing and complete details of operation of entire system included. Foxboro Co., Foxboro, Mass.

Rex Apron Conveyors, Bulletin No. 332, illustrates use and design; includes also detailed engineering information. Chain Belt Co., Milwaukee, Wis.

Rex Roller Chains and Sprockets, Catalog No. 333, includes list prices and dimensions of standard and non-standard roller chains, stock and made-to-order sprockets; also engineering data on selection and application of roller chain drives. Chain Belt Co., 1600 W. Bruce St., Milwaukee, Wis.

Sealmaster Ball Bearing Pillow Blocks, Catalog 7538, detailed information on new line of permanently sealed, pre-lubricated, self-aligning ball bearing pillow blocks; outstanding features stressed, also features of unusual construction. Stephens-Adamson Mfg. Co., Aurora, Ill.

Silicate P's and Q's, October, 1938, discusses the art of washing with silicates. Phila. Quartz Co., 121 S. Third St., Phila., Pa.

Solenoid Valves, loose leaf bulletin, on valves for steam and gas, liquids and air, and automatic controlling devices; contains index and service recommendations, service data, specifications, prices, etc. Automatic Switch Co., 154 Grand St., New York City.

Spray Equipment, leaflet, describes new Dynaprecipitor Unit, said to be a marked improvement over the ordinary water wash booths; new precipitator plates and water curtain are outstanding features; other spray equipment installations illustrated. Binks Mfg. Co., 3113 Carroll Ave., Chicago, Ill.

Synthetic Organic Chemicals, November, 1938, feature "Synthetics Used in Perfumery," Part 2. Eastman Kodak Co., Rochester, N. Y.

The Alloy Pot, Vol. 6, No. 3, Annual Metal Show issue, chock-full of die casting applications, hints for die casting consumers, and a brand new feature "Bibliography of Die Casting Information," which will be brought up to date at regular intervals. New Jersey Zinc Co., 160 Wall St., New York City.

The Clean-Up, October, 1938, articles and data of pertinent interest on use of chemical specialties in solving various problems; advertising wide range of specialties made by this company. C. B. Dolge Co., Westport, Conn.

The Givaudanian, Industrial Aromatics Division, September, 1938, feature article continues discussion on use of aromatics and their use in industry begun in July issue; this instalment dealing principally with their use in pharmaceutical industry. Givaudan-Delawanna, Inc., 80-5th Ave., New York City.

The Glass Lining, Vol. 11, No. 2, an equipment and service magazine for the dairy, food, beverage and chemical process industries; handsomely illustrated. Pfaudler Co., Rochester, N. Y.

The Parkerizer, September, 1938, items on newer adaptations of the Parker Rust-Proof process. Parker Rust-Proof Co., Detroit, Mich.

The Pioneer, September, 1938, of especial interest to users of chlorine and alkalies. Electro Bleaching Gas Co., 60 E. 42nd St., New York City.

Thiokol Facts, Vol. 1, No. 15, features "Oil-proof Guard for Metal Gas Hose Nozzles," also other new adaptations of Thiokol. Thiokol Corp., 780 No. Clinton Ave., Trenton, N. J.

Wholesale Price List, October, 1938, Fritzsche Bros., 76-9th Ave., New York City.

Zinc Alloy Die Castings in Hardware and **Zinc Alloy Die Castings in Industrial Equipment,** booklets, place particular emphasis on the fact that the physical and fabricating properties of these castings are such that their scope of usefulness becomes wider each year; booklets contain many unusual applications in these fields, illustrated; include also sp. gr., melting point, and electrical conductivity. New Jersey Zinc Co., 160 Front St., New York City.

New Chemicals for Industry

A digest of products and processes

Solvents in Dyeing

Possibility of Increased Consumption

By J. Wakelin

It is admitted that from the standpoint of cost alone, water is by far the best medium for the application of dyes to textile materials, but there have been indications in the recent patent literature that under special circumstances solvents may play a very useful part, and indirectly enable time and materials to be saved. From this angle the use of solvents is not so impracticable as a cursory consideration of the question might lead one to think.

Solvents of an organic nature possess often the advantage of being very rapid penetrants of textiles and also of being quickly removed by evaporation. Where speed is the paramount consideration, solvents may well be introduced with advantage. A few seconds only from start to finish is the time taken in a process protected by British Celanese by a patent.

Cellulose acetate rayon yarn of 150 denier is dyed by passing it through a 0.25 per cent. solution of 1-amino-4-hydroxy-anthraquinone in a mixture of 40 parts ethyl acetate, 60 parts ethyl alcohol and 20 parts water at ordinary temperature. The fiber travels at 180 feet per minute through a bath 6 feet long, so that the time of actual contact is extremely small. The yarn then passes through air at 40° C. for 150 feet to dry it. A red shade is obtained and the total time expended is about one minute.

Alternatively, a cellulose acetate dye may be dissolved in a mixture of 20 parts xylene and 80 parts ethyl acetate. Other suitable carboxylic esters are ethyl formate, methyl acetate and isopropyl acetate. Preferably the boiling point of the ester solvent should be below 100° C.

A Dutch inventor claims that ethyl alcohol may be very usefully added to the dye vat in order to promote good penetration of the cotton fiber and to obtain level dyeings. Readers will recall that the so-called vat dyes are insoluble themselves, but when reduced with alkali and hydrosulfite are converted to a soluble form in which they may be applied to the textile goods. Subsequently the original color of the dye which was lost in reduction is restored by oxidation with air or chromates.

The presence of solvent is stated to increase the degree of dispersion of the reduced (or leuco-) vat dye to just the right degree. Should the dispersion be too high the material does not take up the dye and valuable coloring matter is lost. If too low, the dispersion brings about irregular dyeings.

To prepare a bath, 10 liters water and methylated spirits each are mixed and 1.2 liters of caustic soda (38° Bé) added together with 400 grams of sodium hydrosulfite. 110 grams of the vat dyestuff (Brilliant Violet RR Powder is quoted) is added and reduced in the vat at about 57° C. Cotton yarn is immersed for 10 to 15 minutes after which the liquor is diluted with distilled water to 100 liters and a further kilogram of hydrosulfite is added. Dyeing is now continued in the usual way for 15 minutes, the yarn washed, oxidized, acidulated and finally soaped and dried.

It is not always speed alone, but sometimes convenience and ease of performance, which determines the choice of a method. The extra cost of using some compound in the process may be compensated by the saving of an operation or by the combination of two stages in one, in which case the saving in labor may make the change satisfactory from the economic standpoint.

Normally textile fibers are dyed in an open, stretched condition in order that the liquor may reach every part and avoid inequalities due to folds and creases. It follows from this that a considerable amount of space is taken up and that large quantities of dye liquor are necessary. One method of dyeing which is used in a limited way for dyeing yarn, principally coarse vegetable material, is to wind the yarn onto a "cop" which consists of a perforated bobbin through which the dye liquor is forced. The liquor traverses the fibers and dyes them in a very short time, but naturally, not always quite evenly.

Regenerated cellulose fibers, according to certain recent inventions, may be dyed in the form of a cake and solvents may be employed very helpfully in this connection. After spinning, the rayon fibers in the form of a wound package are first washed free from acids, but while still wet are dyed by circulating through the package a solution of sulfur black dye plus an addition of methyl alcohol or other solvent. A sulfur color dissolved in sodium sulfide may contain 10 per cent. of the alcohol, its addition being not, however, merely to hasten penetration in the obvious sense, but to restrain the tendency of the fibers to swell. This naturally enables the liquor to circulate more readily through the package.

This package dyeing process may be used in the application of napthol and azoic colors. First there is circulated an alkaline liquor containing the anilide of 2:3 hydroxynaphthoic acid, soda and formalin with an addition of isopropyl alcohol. The azo coloring matter is then developed by the passage through of an aqueous solution of Fast Scarlet GGS base, hydrochloric acid and sodium nitrite. (E. P. 482,324).

Cellulose ester rayon may be dyed with azo colors with the aid of solvents. In this case both the basic component and the napthol are dissolved together in a mixture of solvents and the fibers dried before being developed by an aqueous nitrite solution. 35 grams of the meta-nitranilide of oxynaphthoic acid and 16 grams of 5-nitro-2-aminotoluene are dissolved in 3 liters of ethyl acetate and 27 liters of petrol, and the solution is circulated through bobbins of cellulose acetate at 70° C. The bobbins are then rinsed in cold gasoline, dried with warm air and developed by the passage through of 80 grams sodium nitrite, 280 cc. of glacial acetic acid dissolved in 20 liters of water for 30 minutes at 18°C., and after this coupling is brought about by circulating a 0.025 per cent. solution of sodium carbonate at a temperature gradually rising up to 80°. The bobbins are then rinsed and dried to obtain a fast red dyeing.

The solvent principle in package dyeing appears to be capable of extension to a number of spheres of dyeing, for example, to the aniline black dyeing of regenerated cellulose or acetate rayon yarn. Regenerated cellulose yarn in the form of a wound package is treated with aniline hydrochloride, sodium chlorate and copper chloride dissolved in a 69 per cent. mixture of acetone in water. The bobbin is centrifuged to remove excess liquor and the dye oxidized by subjecting the yarn to moist warm air. Following this there is the usual chroming process

to destroy potentially oxidizable substances, and the yarn is washed. (E. P. 482,344).

In the foregoing examples solvents are used purely as media for carrying a dye or chemical agents and no change is understood to take place in the solvent itself. Indirectly but legitimately related to the main theme is the use of solvents in dyeing which undergo decomposition. In the dyeing of mixed fabrics containing both wool and viscose rayon, it is proposed, for example, to use diethyl, dibutyl or diamyl tartrate in conjunction with the solubilized vat dyes. The fabric is first padded with a neutral or alkaline mixture when fixation to the cellulosic fibers takes place. During the subsequent steaming, the tartrate decomposes and liberates acid which promotes the fixation of dye to the wool. Finally, after oxidizing and developing, both components of the union are uniformly colored.

Develops New Dyeing Technique

A radically new technique of textile printing or padding is disclosed in the announcement of Ciba Co., Greenwich & Morton Sts., New York City, of an entirely new class of coloring matters patented under the name "Neocotones." Discovery makes possible the printing of fast azoic colors with a minimum ot effort and with greatly increased production. These new products are really water soluble, direct naphthols; may be mixed together at will; are visible at all times, and may be run beside ordinary vat colors or aniline black. The first member of the series is Neocotone Scarlet G, which is suitable for application to all forms of cotton and viscose rayon. The resultant bright prints are of good fastness to light, washing, chlorine, perspiration and crocking.

Activated Carbon from Coal

A process for manufacture of activated carbon has been developed in England and is described in a monograph issued by the Department of Scientific and Industrial Research known as Fuel Research Technical Paper No. 47, entitled "The Production of Active Carbon from Bituminous Coal." Novelty of the new product is said to be in that it is prepared from graded lump coal without the necessity of grinding and briqueting, the cost of the finished product being thus considerably reduced. It is claimed that the carbon so produced is suitable for gas masks and to a certain extent for industrial use. (Office of the American Commercial Attache, London.)

Anhydrous Stannous Chloride

Stannochlor (anhydrous stannous chloride) is a new industrial chemical made by Prior Chemical Corp., 420 Lexington Ave., New York City, which is said to possess marked advantages over ordinary tin crystals in regard to stability, concentration and purity.

Textile Water-repellent

Aero-Dri, a new "one bath" water repellent for all types of textiles, is announced by American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York City.

Sugar Beets Fertilized with Phosphates

Results of experiments, by the U. S. Bureau of Plant Industry, on the effect of fertilizers on sugar beets, were summarized in a recent bulletin of the Idaho College of Agriculture, according to *The American Fertilizer*, Oct. 1, '38. Beet losses in storage piles have always caused a serious drain on this industry. To test the keeping quality of unfertilized beets and those receiving an application of superphosphate, samples of beets in open-meshed bags were placed in the factory storage piles. Decay losses in the phosphorus-starved beets were three to five times as serious as those in the fertilized beets. Increases in yield were about what was expected from the addition of phosphates, but the improved keeping quality is an additional reason for applying superphosphate.

Production Normal Caproic Acid

Commercial availability of normal caproic acid, as announced by Carbide and Carbon Chemicals Corp., 30 East 42nd St., New York City, is expected to create considerable interest as a chemical intermediate in the manufacture of certain pharmaceuticals, resins, rubber chemicals, and essential oils. Caproic acid is the normal, straight-chain, six-carbon atom compound of the fatty acid series. It is a colorless liquid of characteristic odor. It boils at 202° C., freezes at 4.7° S., and has a specific gravity of 0.9280 at 20/20° C. It is only slightly soluble in water, but is soluble in alcohol and many other organic compounds. The commercial material contains well over 98 per cent. caproic acid by weight. New esters, anhydrides, salts, ketones, amides and other derivatives useful to industry can be prepared from caproic acid. Its esters are important in the manufacture of flavors, perfumes, and essential oils. The ethyl, amyl, and allyl esters of caproic acid, in particular, are used as synthetic flavors. It also offers possibilities for the production of cellulose esters which have greater solubility in organic solvents than those of lower-boiling acids. Other derivatives, such as the anhydride, salts, or amides, have higher boiling points, greater oil solubility, and lower water solubility than those obtained from acetic, propionic or butyric acids. Furthermore, the normal hexyl group can be introduced into certain pharmaceuticals, resins, rubber chemicals, and related products by means of caproic acid. For example, it condenses with phenols to form capropyl derivatives which on reduction yield hexylphenols.

Chemical Plasticizer

A new ester, Dibutyl Sebacate, for use as a chemical plasticizer in nitrocellulose and other plastic compounds, has been made available by The Resinous Products & Chemical Co., 222 W. Washington Sq., Phila, Pa. Dibutyl Sebacate has properties similar to other commonly used plasticizers such as dibutyl phthalate and tricresyl phosphate, but it is claimed to have several outstanding advantages over other materials of this general class, among them the retention of its plasticity at low temperatures. While suitable for a wide range of applications, the properties of this product are such that it is particularly effective for plasticizing vinyl and acrylic type resins. A leaflet descriptive of this plasticizer is available.

Mineral Product for Polishing Compounds

A recent introduction to the grinding and polishing industry is "Felsite," a natural mineral product, which, when used in polishing and buffing compounds, will produce excellent results on stainless steel and all other classes of metal, for cutting down and polishing, and also for mirror finishing. Manufacturer, Mitchell Fels, 274 E. Ashmead St., Germantown, Pa., claims product offers longer and tougher wear and reduces wheel expenditures. It renders smoothness and renders a topped surface in all operations of production. It is recommended for use on all metallic surfaces subjected to high temperatures. Compound contains a special peculiar disintegrated lime, phosphate, alumina, silica, which, when glue is added, will form a hard block and will remain hard until completely used.

Textile Softener

A new product, Perma Par, which is a cat-ion substantive compound said to attach itself permanently to all cellulosic fibres, thus being a permanent softener, is mentioned in *American Dyestuff Reporter*, October 3, '38, p. 558. Product is made from the finest ingredients obtainable; is absolutely pure; will not stain white fabrics; and will not change color shades. It is claimed that the concentration is so high that by its use finishing costs will be lower, in most cases, than has been possible for comparable results. Further, it is unaffected by laundering, dry cleaning, or perspiration, and when used as a print will set most colors, making them more brilliant.

Hydrogenated Rosin

A hydrogenated rosin called "Staybelite" is now available to industrial consumers of resinous materials. Hercules Powder Co., Wilmington, Del., manufacturer, claims this new product retains the advantages of rosin, but virtually eliminates its tendencies to oxidize and become brittle and yellow with age. It is said to be much lighter in color than the lightest rosin available and the color is retained on exposure to light. Hydrogenated rosin will broaden the use of rosin in paint, varnishes, lacquers, adhesive rubber, paper and can be used in other processes where rosin has been indicated, but could not be used previously because of its tendency to oxidize and deteriorate.

Synthetic Finishes

Vitra-Carlite finishes are synthetic resin products made by Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y., which baked at 300° F. for 20 minutes, give films that are glossy, porcelain-like in appearance, tough, hard, and marproof. These finishes are elastic; they have good adhesion to aluminum, brass, cast iron, chromium copper, galvaneel, galvanized iron, steel, tin, and zinc. Colors retain their shade with age to a good degree. New synthetic is available in clear colors, white and black. These finishes have fair outside durability. They are unaffected by gasoline, mineral spirits, machine oil, grease, liquor, 50 per cent. alcohol, cosmetics, hair tonics, oxalic and citric acids.

Permanent Marking Ink

A new ink, for writing on glass or enameled ware, is available in white or black, and is known as "S. R. L." brand LN glass ink. It is easily applied with any steel pen, writing pen or fine brush. The permanency is increased by gently warming the writing. Unlike diamond ink, this ink is non-corrosive, and therefore can be kept in glass bottles rather than in wax containers. Another advantage lies in the fact that it is non-corrosive and non-inflammable. In the paint and varnish laboratory, the ink is especially recommended for writing on "R. P. C." viscosity tubes or Gardner-Holdt "X" or "MT" tubes which must be immersed in water to maintain a constant temperature in the measurement of the viscosity or color of varnishes or oils. Laboratory tests have proven that this ink will resist the action of such severe corrosion agents as hot sulfuric acid, hot nitric acid, hot hydrochloric acid and concentrated alkalies. Furthermore, it is not affected in any way by the action of such solvents as alcohol, acetone, turpentine, toluene, ethylene dichloride or carbon tetrachloride. Manufacturer is Stewart Research Lab., 315- 22nd St., N. W., Washington, D. C.

Tannin Resins for Water Softening

Report of the British Chemistry Research Board, for the triennial period ended December 31, '37, has just been published and contains much information regarding recent work on the use of tannin resins for water softening, according to *Hide & Leather*, October 8, '38, p. 16. During a search by the Board for a substance which would remove iron from water, a satisfactory material was obtained by condensing gallic acid with formaldehyde. The iron in a very dilute ferric chloride solution was removed completely by the gallic acid resin. A dark colored band was produced in the bed of material as the iron was absorbed; the material was regenerated for further use by treatment with dilute hydrochloric acid. Laboratory tap water (hardness 20 pp. 100,000) passed through the material was rendered completely soft. The base exchange values of some of the new tannin resins are given in the report:

	Base-exchange value lb. CaO per 100 lb. material
Larch bark extract	0.8
Indian acacia cutch	0.9
Mangrove cutch	1.1
Wattle bark extract	1.1
Gambier	1.3
Quebracho	2.0

These values compare very favorably with the zeolites.

Chlorinated Rubber Solutions

A process to make chlorinated rubber solutions of varying viscosity and varying degrees of polymerization has been patented by the Chemische Fabrik Buckau, Ammendorf (*India Rubber World*, Oct. 1, '38, p. 60). To attain this the rubber solutions are exposed to the intense light of a mercury lamp or to direct sunlight not only during chlorination, but also—and this is important—for a longer or shorter period after chlorination is complete.

Textile Water-repellents

Textiles, particularly those of cellulosic material, are made water-repellent by treatment with aqueous solutions of alpha-halogen-ethers or alpha-halogen-thioethers of the higher fatty alcohols, which contain at least 10 C atoms in the molecule, in the form of quaternary ammonium compounds, with the addition of water-soluble cyanic acid salts, followed by drying and heating. A surface formation of urethane, and thus a water-repellent effect, is thereby obtained. It is claimed that the advantage of this process lies in the fact that quaternary ammonium compounds of the alpha-halogen-ethers or alpha-halogen-thioethers of the higher fatty alcohols, as well as cyanic acid salts, are soluble in water and therefore the finishing process can be carried out in aqueous solutions and the production of dispersions or the use of organic solvents is avoided. The water-repellent effect is produced on the fibres during the drying process which follows impregnation, the two components first reacting to form an insoluble isocyanate under the action of heat, this isocyanate reacting superficially with the textile material to form a urethane.

Example.—20 grs. of stearoxymethylpyridinium chloride are dissolved in 1 litre of water and to this solution 5 grs. of potassium cyanate are added. With this solution heated to 40-50 deg. C. a textile material, having, for example, a weft and warp of spun rayon, is impregnated, then dried and finally heated for about 4 minutes at 140 deg. C. The fabric thus treated is water-repellent and is also resistant to benzine and soap wash. (Spec. 487,645, mentioned in *Dyer & Textile Printer*, Oct. 7, '38, p. 305.)

Month's New Dyes

Eaton-Clark Co., Detroit, Mich., announces Union Century Black, a new union black of interest to garment dyers who have encountered difficulty in redyeing garments black, especially when the garments were made of wool, cotton or other materials combined with cellulose acetate. It is said to dye wool, cotton, silk and rayon a uniform, deep, true black, leaving cellulose acetate linings, a very light clear gray, with no trace of orange or brown stain. Furthermore, these linings, if desired, are now reported to take a second or Celosilk dye bath successfully, resulting in a clear, deep black.

New products announced by General Dyestuff Corp. include Brilliant Discharge Blue G, an acid color, which is of principal interest for discharge prints on wool and silk. Product not only discharges very well, but offers the very desirable advantage that the discharges will not develop a bluish tint on exposure to light. It produces a very bright blue shade of fastness properties which are satisfactory for average silk or wool print work. Indanthren Brilliant Scarlet RK Powder Fine for Dyeing is a homogeneous vat dyestuff which represents the fastness to light bright scarlet available. It is highly recommended for use by the pigment padding process on account of its extremely fine state of division, also for dyeing cotton yarn and for the production of pale shades on rayon. Diazo Discharge Violet RD produces, when diazotized and developed with Developer A, very bright shades of reddish violet on cotton or rayon. The dyeings are fast to washing and are easily discharged to a very clear white. Benzo Fast Bordeaux 5BL is a direct dyestuff which produces on cotton and rayon full shades of claret possessing good fastness to light. It is also well suited for dyeing of silk-wool unions; and leaves acetate rayon perfectly clear.

Chemical Specialties for Industry

A digest of new uses and new compounds

Washing Technology

A Review of Recent Developments

By H. Peters

MAN'S uninterrupted search for new wetting, dispersing and cleansing agents might be construed by the high-minded to be attributable to a desire for godliness, if we are to believe in a certain old proverb. We are disinclined to underestimate the nobility of the research chemist's motives, we feel safer in assuming that it is the natural search for new knowledge which actuates this unraveling of Nature, and at the cost of being thought cynical, we might add that the desire for financial gain is not entirely absent.

For centuries soap has been the customary detergent, used by young and old alike, but in the case of some of the young, only under compulsion by the old. Now, however, as a result of the progression of science, this ancient commodity is being assailed by new and strange substitutes. Soap stands in no immediate danger of being ousted, largely because so many of the substitutes are too costly, but their competitive influence is certainly being felt and is likely to be increasingly evident as time goes on.

For the sake of simplicity it is proposed to divide this account under a few headings, the first of which is to be

Fatty Detergents

The limitations of ordinary soap have been found to be due principally to the presence of a carboxyl, —COOH, group. This gives soap its salt-forming properties, for instance, with soda, we have sodium stearate, a typical soap. Unfortunately, stearic acid forms a calcium soap, calcium stearate, and this compound is not soluble in water like the sodium salt, and possesses also in the solid, precipitated form, a sticky, slimy nature.

That is why washing in hard water, containing dissolved lime, is not altogether satisfactory with a stearate soap. Precipitation of a lime soap occurs, which means the removal of the effective detergent substance from solution, and at the same time, the formation of distinctly unpleasant sticky mass of lime soap. This matter, either as a curd on the surface of the liquid, or a floating mass, attaches itself to the containing vessel or deposits itself as a sticky film on the article being washed.

The prevention of this happening requires the pre-softening of the water before use, or the addition of alkaline softening agents at the time of use. Against the first remedy there is no objection except cost and inconvenience, but these two frequently rank very high in importance where commercial processes are concerned. The simultaneous softening procedure, in turn, requires usually the use of soda or other alkaline agents which may not be without drawback in the cleansing of delicate protein material, such as is sensitive to alkaline conditions.

A great step forward in the search for the ideal detergent was made when the —COOH group was eliminated altogether. On hydrogenation, or reduction, all carboxylic acids are converted to an alcohol having instead of COOH, the characteristic group $—CH_2OH$. Palmitic acid, as a case in point, reduces to cetyl alcohol, $C_{16}H_{33}OH$. The sulfuric acid ester of this is water soluble and gives a sodium half-salt, $C_{16}H_{33}.O\ SO_3Na$, which is an excellent detergent. The sulfate radicle provides the water solubility just as a COOH group would in the same position, but there is the advantage that the calcium salt of the sulfuric ester is comparatively soluble in water. A solution of sodium cetyl sulfate, for example, is not nearly so sensitive to the presence of lime, magnesium or any other hardening salts as is the carboxylic acid, soap.

The sulfated fatty alcohols are now no longer in the novelty class as far as chemical specialties are concerned; they have been applied in nearly every conceivable sphere of textile technology, as an adjunct in the formulation of toilet preparations, and used in countless other directions.

Recently there has been introduced a series of detergent compounds wherein the polar group is an amine and consists of an ammonium-like configuration. Cetyl pyridinium sulfate, for an example, $C_5H_5.N(C_{16}H_{33}).SO_4H$, or cetyl trimethyl ammonium bromide, $C_{16}H_{33}.(CH_3)_4.N.Br$, possess a fatty alcohol radicle terminated by a methylated nitrogen atom; both are effective detergents and are not affected by hard water, or by acids. A distinctive feature of these bodies is that when dissolved in water they ionize, but it is the cation, the positively charged ion, which confers the surface active qualities. In soap and also in the sulfated fatty alcohols, ionization in solution yields a surface-active anion.

The quaternary ammonium compounds are simply made by reacting together equivalent proportions of pyridine or other tertiary amine and the bromide or other compound of a fatty alcohol. Thus, 31 parts by weight of cetyl bromide and eight parts of pyridine are heated together at about 150° C. until a sample withdrawn and cooled, solidifies and proves to be soluble in water.

This substance, or the analog from stearyl bromide, is stated to be suitable for washing raw, limy wool. Fifty parts by weight dissolved in 50 liters of water, to which has been added 300 parts of 36° Tw hydrochloric acid, is used for washing 1000 parts of wool. This bath, although freely acidic, lathers readily and cleanses the fibrous matter satisfactorily in about 30 minutes, a temperature of 40 to 45° being maintained. The procedure of washing in dilute acid, which is plainly necessary where excessive amounts of lime are present, constitutes a novel departure from the normal soap and soda bath.

Mineral Aids To Washing

No survey of the inorganic cleansing assistants would be complete without some allusion to sodium hexametaphosphate, $Na_6P_6O_{18}$. Water containing this salt does not react in the normal way when soap and calcium salts are brought together in it. The lime present, unlike most softeners, does not precipitate with this salt, but combines with it chemically to form an innocuous complex salt. For all practical purposes, this compound prevents lime soaps from forming and enables the maximum cleansing to be obtained with a given quantity of soap even in the presence of hardening salts. The base-exchange reaction: $Na_6P_6O_{18} + 2Ca'' = Na_2Ca_2P_6O_{18} + 4Na'$, is stated to take place, showing that calcium ions are totally removed from the solution and their influence eliminated.

Metallic fluorides are reported to be of value in cleansing and especially as an addition to the rinsing liquor. Acids salts, such as the bifluorides are suggested, their acidity being sufficient to neutralize residual alkalinity after a washing. Thus, a mix-

ture of sodium lauryl sulfonate and sodium bifluoride is cited as one example. The aim is to neutralize the rinsing water and enable a pH of 5 to pH 7 to be attained. (Patent to Rutgers-Werke Akt. Ges., Berlin, 1934.)

Trisodium and other phosphates have a very definite place in the world of detergent auxiliaries and demand mention in an article of this kind. They are to be skipped over, however, not because of their being little thought of, but rather because it is felt that the reader already knows them well and needs no further advocate for their merits.

The pyrophosphates, however, are not so widely recognized for their detergent value. Henkel et Cie disclose in a patent that alkali metal pyrophosphates appreciably increase the lathering power of certain wetting agents and thus enhance their value. The wetting agent, sodium isopropyl-naphthalene sulfonate alone possesses considerable wetting ability. (A product of the "Perminal," "Nekal," or "Leonil" type.) An experiment indicated a 0.5 per cent. aqueous solution showed a lathering index of 595. The addition of 0.05 per cent. sodium pyrophosphate to the same solution raised the lathering index to 850.

The I. G. have a patent in which they report sodium pyrophosphates may be introduced into the washing bath for textiles when detergents of the "Igepon" type are used. It promotes a very fine dispersing of the inorganic, insoluble particles present, and ensures that they do not attach themselves to the fabric under treatment.

Readers will already be aware that the proprietary detergent body called "Igepon A" consists principally of the oleyl derivative of isethionic acid, $C_{17}H_{33}.CO.O.CH_2.CH_2.SO_3Na$, while the "T" brand of the same is derived from the corresponding amine, taurine, compound. These substances are already accepted as reliable detergents by many textile chemists and soap technologists, but it is of interest to note a recent disclosure of the I. G. that useful cleansing compositions for washing raw, greasy wool are obtained by mixing these with sulfated fatty alcohol products (E. P. 471,921).

A detergent containing the enzyme, papain, is the subject of another new invention. This digestive ferment from the fruit of the papaw is extremely active in the presence of chemicals and withstands heating to 70° C. Soiled fabrics of silk, cotton or linen are cleansed by treatment with a solution containing papain, soap, soda and sodium polysulfide. (Sulfur compounds accelerate the enzyme action.) The operating temperature may be up to 80°. After this, the material is boiled in water, rinsed and dried (E. P. 475,880).

Wood Preservative and Finish

A recent report, issued by University of California, on tests on the paintability of woods treated with different preservatives that are termite repellent, disclosed the fact that wooden panels, which were found to be free from any signs of warping or cupping, after 54 months' exposure, had been treated with Lignophol, a wood preservative and finish manufactured by L. Sonneborn Sons, Inc., New York City. The brushed on Lignophol was said to be as effective as the pressure impregnation type of wood preservative whose application is beyond the facilities of the average home owner. It is claimed to be a permanent finish whose use enhances the inherent beauty of the wood.

Metal Protective Paints

A line of metal protective paints in which a synthetic product known as Kem Liquid is used in their formulation has been announced by Sherwin-Williams Co., Cleveland, Ohio. Paints designated as the S-W Kem-Metal protective paints, include Kem-Kromik metal primer, Kem-Elastic metal protective paints, and Kem red lead (primer). They are stated by the manufacturer to have the following advantages: more complete exclusion of water and gases from the metal protected, a definitely greater durability, and an improved appearance that is maintained in service.

Antiseptic and Germ Resistant Process

A new process that renders fabrics actively antiseptic and germ resistant, is announced by Neva Wet Corp. of America, New York City. The first license for the process, called Sani-Age, has been issued to the Superior Felt and Bedding Co., Chicago, for a ninety-nine-year period.

Polishing Compounds

The addition of several new numbers to their line of cutting down and polishing compounds is announced by Harrison & Co., Haverhill, Mass.

Odorless Degreasing Compound

Hydralene, an odorless cleaning compound, is a new development of The Curran Corp., Malden, Mass. This recent development required several years of chemical research before being able to introduce commercially a super Gunk which is characterized by its entire lack of odor. It is soluble in kerosene or other petroleum distillates in all proportions without separation or losing its homogeneity. The new Hydralene Gunk is especially adapted for use by dairy or bakery truck garages where the sanitary odor of phenolic Gunk might prove to be objectionable.

Soap for Synthetic Cleaning Systems

A soap and detergent for synthetic cleaning systems is announced by Atlantic Oil and Chemical Works, 127 Warren st., Dayton, O. "Klor-O-Sol" is said to have many advantages when used with carbon tetrachloride, trichlorethylene, or perchlorethylene, including the retention of the soft pliable condition of fur trimmings, as well as silk and woolen garments.

Unshrinkable Wool Blankets

A new process for production of unshrinkable wool blankets is entirely different from processes formerly used, in that the material is treated with a solution of sulfuryl chloride in clean dry-cleaning solvent. Process is very simple, and rigid control measures are necessary to obtain desired results, but results far surpass those of any other known process, in that the felting and shrinking properties of the individual wool fibers are entirely eliminated. The shrink-proofing is obtained by the action of the sulfuryl chloride on the serrations of the individual fibers and without the injury of damage resulting from treatment with chlorine, hypochlorites, or hypochlorous acid. Quite unexpectedly, the treated wool fibers are actually 20 to 25 per cent. stronger than the untreated fibers, slightly whiter in color and, when properly processed, are considerably softer than the untreated wool, all of which is very desirable from the standpoint of both the textile manufacturer and the consumer.

Reagent used is sulfuryl chloride, and at no time during process does any free chlorine appear in the bath. This is proven by the fact that yarns and fabrics dyed with chlorine-fugitive dyestuffs are not bleached during the sulfuryl chloride treatment. Actually, the action is entirely different from that of chlorine or hypochlorites and it is impossible to obtain any test (starch-iodide, etc.) for chlorine or hypochlorites during the treatment.

In the older chlorine processes, as well as with other halogens, the serrations of the wool are more or less destroyed, the extent of the damage and unshrinkability both depending upon the extent or degree of chloration. In the new Dri-Sol process, microscopic examination shows the serrations as flattened against and fastened to, the surface of the wool fibers. This is quite different from the destructive action of chlorine and accounts for the increased strength of Dri-Sol treated fibers. Process was developed by A. J. Hall, of England, and is protected by patents in all countries. It has been in use in England for several years and on the Continent for about a year. It can be applied to wool in any stage of manufacture, and it is believed that it will be of great value to every branch of the industry.

Osmal
387,031

PORTLAND CEMENT
TRIUMPH BRAND
"SPALATO" PORTLAND CEMENT COMPANY
MADE IN JUGOSLAVIA
387,955

CELLU-CRAFT
390,053

UNAFLO
UNAFLO
394,440

BLAZER
396,756

STYRON
401,692

STYREX
401,693

LIT
401,988

VIRG-MET
402,438

Chemi-Grow
402,555

GLASS-MASTER
402,461

Plastiment
402,883

BITUTEX
404,558

THRIFTY
GASOLINE
404,923

SUPREME
405,159

SEALOX
405,611

TINSIL
409,771

TILO
405,745

NOVUSOL
405,817

Plastocrete
405,865

GLOSS
STARCH
406,165

All-Weather
LAMINEX
406,316

TRI-SOL
406,560

J.R. Watkins
406,610

BROWN'S LANE SOAP
407,004

SUNOCO
A TO Z
LUBRICANTS
407,074

MOROCCO CREAM
407,269

SEABOARD COLLOIDAL MINERALS
407,334

BANNER-TONE
407,354

NUTROL
407,475

407,628

LUXTRA
407,770

Amerundum
407,786

RESINICOTE
407,805

STA-HI
408,228

LESODER
409,777

PERVOLITE
WEARS
407,963

ELGETOL
407,993

SINOX
407,994

Sealcon
408,055

Flare
408,087

BEKOLIN
408,089

STEELGRIP
408,131

PENETREX
408,241

387,031. Chemische Fabrik R. Baumheier, Aktiengesellschaft, Oschatz-Zschollau, Germany, (Chemische Fabrik R. Baumheier Kommanditgesellschaft); Dec. 22, '36; surface-protective paints and the ingredients thereof; use since Sept. 14, 1934.

387,955. "Split" Anonimno Drustvo Za Cement Portland, Split, Yugoslavia; Jan. 19, '37; Portland cement; use since Jan. 1, 1930.

390,053. Detroit Macoid Corp., Detroit, Mich.; Mar. 15, '37; lacquer and like coating compositions; use since Aug. 28, '38.

394,440. Universal Atlas Cement Co., Chicago; June 23, '37; oil well cement; use since Oct. 5, '36.

396,756. Ashland Oil & Refining Co., Ashland, Ky.; Aug. 26, '37; gasoline; use since Dec., '36.

401,692. Dow Chemical Co., Midland, Mich.; Jan. 8, '38; polymerized styrene; use since Dec. 1, '37.

401,693. Dow Chemical Co., Midland, Mich.; Jan. 8, '38; polymerized styrene; use since Dec. 1, '37.

401,988. I. S. Crane, Inc. (Lit. Co.), Chicago, Ill.; Jan. 17, '38; cold water paints, enamels, varnishes, lacquers, etc.; use since Dec. 15, '37.

402,438. Northwest Lead Co., Seattle, Wash.; Jan. 28, '38; solder; use since Dec. 1, '37.

402.555. Chemi-Grow, Ltd., Los Angeles, Calif.; Feb. 1, '38; fertilizer for use in water tank farming; use since Nov. 11, '37.

402,461. Anderson Co., Gary, Ind.; Jan. 29, '38; cleaners for windshields and other glass surfaces; use since Dec. 3, '37.

402,883. Kaspar Winkler & Co., Altstetten, Switzerland; Feb. 9, '38; preparation to add to construction materials to improve their binding or setting qualities; use since Aug., '33.

404,558. American Bitumuls Co., Wilmington, Del., and San Francisco, Calif.; Mar. 28, '38; asphalt, asphalt emulsions and compositions; use since Mar. 4, '38.

404,923. Sunset Oil Co., Los Angeles, Calif.; Apr. 5, '38; gasoline; use since Feb. 10, '38.

405,159. W. T. Grant Co., New York City; April 12, '38; pre-wax cleaner and cleanser and polish for tile, porcelain and glass; use since May 28, '37.

405,611. Norfolk Paint & Varnish Co., Quincy and No. Quincy, Mass.; Apr. 22, '38; wall primer and sealer; use since Mar. 1, '38.

409,771. Arthur E. Keller, (E. Keller & Sons), Allentown, Pa.; Aug. 19, '38; silver polish; use since Aug. 12, '38.

405,745. Tilo Roofing Co., Inc., Stratford, Conn.; Apr. 26, '38; paints for roofing and siding materials for protecting exposed surfaces; use since 1915.

405,817. National Oil Products Co., Harrison, N. J.; Apr. 28, '38; plasticizing compound and defoamer; use since Apr. 1, '38.

405,865. Kaspar Winkler & Co., Altstetten, Switzerland; Apr. 29, '38; preparation to add to construction materials to improve their binding or setting qualities; use since Feb. 13, '34.

406,165. American Maize-Products Co., New York City; May 10, '38; laundry starch; use since Nov. 29, '37.

406,316. Wheeler Osgood Sales Corp., Tacoma, Wash.; May 13, '38; resin bonded plywood; use since Nov., '37.

406,560. Oklahoma Sanitary Supply Co., Oklahoma City, Okla.; May 20, '38; degreasing solvents; use since Aug. 1, '37.

406,610. J. R. Watkins Co., Winona, Minn.; May 21, '38; polishes, polishing waxes, and polishing oil for floors, etc.; use since Mar. 2, '38.

407,004. James Brown, Mt. Vernon, Ohio; June 2, '38; soap for general cleaning purposes; use since Jan. 1, '38.

407,074. Sun Oil Co., Phila., Pa.; June 3, '38; lubricating oils and greases; use since Apr. 18, '38.

407,269. Otis D. James, Oklahoma City, Okla.; (to U. S. Chem. Co., Okla. City); June 9, '38; cream for restoring and treating leather bookbindings; use since June 6, '38.

407,334. Sea Board Supply Co., Phila., Pa.; June 10, '38; ground soil fertilizers; use since June 6, '38.

407,354. Banner Paint & Varnish Corp., Brooklyn, N. Y.; June 11, '38; paints and varnishes; use since May 5, '38.

407,475. J. W. Spencer (Woburn Spencer & Co.), New Orleans, La.; June 14, '38; neutral potash scrub cleanser (not a soap); use since Feb. 15, '31.

407,628. Sidney J. Evans (Evans Mfg. Co.), Cleveland, O.; June 18, '38; moth exterminator and deodorant; use since Sept. 1, '36.

407,770. Societe Commerciale Des Produits du Petrole, Paris, France; June 22, '38; heavy lubricating oil; use since April, '38.

407,786. American Optical Co., Southbridge, Mass.; June 23, '38; lens grinding and polishing compounds; use since Mar. 21, '38.

407,805. General Crushed Stone Co., Easton, Pa.; June 23, '38; bituminous paving materials; use since June 7, '38.

408,228. E. L. Wilson, Jamaica, L. I., N. Y.; July 6, '38; battery compounds; use since Mar. 14, '38.

409,777. Pittsburgh Plate Glass Co., Pittsburgh, Pa., Aug. 19, '38; paints, paint primers, enamels, etc.; use since July 1, '38.

407,963. Herman H. Van Dulst (Pervo Co.), Los Angeles, Calif.; June 27, '38; penetrating paint paste for stucco, brick, stone, etc.; use since June 1, '38.

407,993. Standard Chemical Prods., Inc., Hoboken, N. J.; June 28, '38; spray and winter treatment for fruit and other trees, also as fungicide and insecticide; use since Jan., '38.

407,994. Standard Chemical Products Co., Hoboken, N. J.; June 28, '38; spray for destruction of weeds; use since Jan., '38.

408,055. Formoil Co., Minneapolis, Minn.; June 30, '38; transparent waterproofing for all types of concrete work, brick and stucco; use since Apr. 28, '38.

408,087. Bell Co., (Flare Labs.), Chicago, Ill.; July 1, '38; cements for bicycle rims, rubber, matting, iron, rubber tape for splicing purposes, tire thread cut filler, and similar products; use since April 14, '38.

408,089. Karl Beck, Treuchtlingen, Germany; July 1, '38; moth repellent and destroyer; use since 1914.

408,131. Parker Rust Proof Co., Detroit, Mich.; July 1, '38; chemicals for treating steel surfaces to obtain thereon corrosion-resistant, paint-holding coatings; use since June 28, '38.

408,241. Hercules Powder Co., Wilmington, Del.; July 6, '38; textile dyeing assistant and penetrant; use since Oct. 29, '37.

408,377. Emporium World Millinery Co., Chicago, Ill.; July 11, '38; sponge rubber cleaner for clothing and hats; use since July 1, '36.

408,454. L. O. Church Corp., Peoria, Ill.; July 13, '38; anti-freeze solution for internal

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazette*, Sept. 13 to Oct. 11, inclusive.

DAPPER
408,377

ESKO
408,454

ALKYDAL
408,464

MOBIL
408,518

LAESTRELLA
408,538

VORTEXOL
408,589

AUTOGROOM
408,632

PATHEX
408,638

CALI-FOAM
408,639

HERCULES
408,645

KIL-MOE
409,734

CARBITUN
409,677

408,643

TEXALENE
408,666

BESTOWAX
408,710

GLACHIN FINISH
408,711

TALCON
408,712

TRAMOLIN
408,713

AVONAC
408,758

Perminink
408,798

TEXTONE
408,806

LAM-O-DEX
408,833

HI-REV
408,835

SANTOX
408,851

PERMAFRESH
408,866

tawn
408,890

FAX
"GET THE FACTS"
FAX CORPORATION NEW YORK
408,916

MAGIKIL
408,956

MYSTIKIL
408,957

MASTER X
408,961

LIM-RUS
408,976

FUNGCHEX
408,979

San-a-Shoe-
409,080

LINAC

409,005

Phelan's
1-2 HOUSE PAINTING SYSTEM
Gets at the Heart of Paint Failures
409,020

Perbunan
409,037

PRIME
409,058

409,312

THE LITTLE PLUMBER IN THE CAN
409,088

FLEXITE
409,097

ALKALATE
409,115

NAPTEX
409,277

CATARACT
409,289

HERCULES
409,313

SOFORM
409,354

PAL-EZE
409,474

NUPRO
409,484

Etsul
409,625

combustion engine cooling systems; use since June 30, '38.

408,464. I. G., Frankfort-on-Main, Germany, July 13, '38; artificial resins; use since Jan. 8, '38.

408,518. Socony-Vacuum Oil Co., New York City; July 14, '38; lubricating oils and greases and petroleum fuel distillates; earliest use since June 15, '34.

408,538. General Paint Corp., San Francisco, Calif.; July 15, '38; paints; use since May 12, '20.

408,589. Vortexol Co., Saugus, Mass.; July 16, '38; waterproofing compounds for leather, also a leather dressing; use since Oct. 24, '21.

408,632. Autogroom Co., New York City; July 19, '38; preparation for production lustre on finished surfaces; use since Mar. 4, '38.

408,638. Gen'l Chemical Co., New York City; July 19, '38; fungicides; use since June 6, '38.

408,639. General Household Necessities Co., Los Angeles, Calif.; July 19, '38; non-explosive cleaning solvent for general household purposes, having deodorizing and moth preventive properties; use since June 13, '38.

408,645. Hercules Powder Co., Wilmington, Del., July 19, '38; casein, cellulose acetobutyrate-nitrohydroacetate-hydroacetate, etc., and chlorinated rubber; earliest use since Sept. 24, '32.

409,734. Samuel A. Halaby, Rochester, N. Y.; Aug. 18, '38; insecticides in liquid form; use since May 15, '38.

409,677. Binney & Smith Co., New York City; Aug. 17, '38; compounds for softening rubber and similar materials; use since July 11, '38.

408,643. Hercules Powder Co., Wilmington, Del.; July 19, '38; casein, cellulose acetobutyrate-nitrohydroacetate-hydroacetate-nitroacetate, etc., and chlorinated rubber; earliest use since Sept. 24, '32.

408,666. Texas Co., New York City; July 19, '38; diesel gas oil; use since June 20, '38.

408,710. Hercules Powder Co., Wilmington, Del.; July 20, '38; emulsified combination of waxes and fats for textile finishing; use since Apr. 9, '38.

408,711. Hercules Powder Co., Wilmington, Del.; July 20, '38; emulsified vegetable waxes and fats for textile finishing; use since Apr. 9, '38.

408,712. Hercules Powder Co., Wilmington, Del.; July 20, '38; sulfonated high titre fats used in finishing textiles; use since Mar. 22, '37.

408,713. Hercules Powder Co., Wilmington, Del.; July 20, '38; treated vegetable oil used in textile finishing; use since Apr. 9, '38.

408,758. National Aniline & Chemical Co., New York City; July 21, '38; wetting out, softening, and emulsifying agents, and dye assistants; use since Nov. 15, '35.

408,798. Isidore H. Gilbert (Progressive Lab. Specialties Co.), Jamaica, N. Y.; July 22, '38; ink; use since July 10, '38.

408,806. Mathieson Alkali Works, New York City; July 22, '38; sodium chlorite; use since June 30, '38.

408,833. Corn Prods. Ref. Co., New York City; July 23, '38; combination of dry starches, dextrines, or gums for pasting purposes; use since July 15, '38.

408,835. Emerol Mfg. Co., New York City; July 23, '38; solvent for gums or sludge; use since Mar. 25, '38.

408,851. Monsanto Chemical Co., St. Louis, Mo.; July 23, '38; preventers of rancidity in soap and vegetable oils; use since July 8, '38.

408,866. Warwick Chemical Co., West Warwick, R. I.; July 23, '38; compounds to render fabrics spot and perspiration resistant and water repellent; use since July 11, '38.

408,890. McKesson & Robbins, Inc., Bridgeport and Fairfield, Conn.; July 25, '38; insect repellent; use since July 18, '38.

408,916. Fax Corp., New York City; July 26, '38; motor fuels, gasoline, fuel oils, kerosene, and like products; use since June 1, '37.

408,956. Lethelin Prods Co., Wood Ridge, N. J.; July 27, '38; bait for killing ants; use since March, '35.

408,957. Lethelin Products Co., Wood Ridge, N. J.; July 27, '38; insecticide or plant spray for killing sucking and chewing insects, and plant insects; use since March, '35.

408,961. Master Chemical Co., Portland, Ore.; July 27, '38; bleacher, cleaner, deodorizer, and disinfectant; use since Jan. 14, '36.

408,976. Lisle C. Van Nest, (National Labs.), Toledo, O.; July 27, '38; preparation for removal of rust and stain from porcelain, enamel, or vitreous china surfaces; use since Aug. 1, '37.

408,979. Wood Ridge Mfg. Co., Wood Ridge, N. J.; July 27, '38; parasiticide and fungicide; use since June, '36.

409,080. Caravel Products Co., New York City; July 30, '38; deodorants and disinfectants; use since July 18, '38.

409,005. Linden Chemical Co., Rahway, N. J.; July 28, '38; glass-fabric-and hand cleaner, and tar remover; use since June 6, '35.

409,020. Phelan-Faust Paint Mfg. Co., St. Louis, Mo.; July 29, '38; paints; use since July 18, '38.

409,037. I. G., Frankfort-on-Main, Germany; July 29, '38; synthetic rubber and rubber-like materials; use since July 30, '37.

409,058. Prim Corp., St. Louis, Mo.; July 29, '38; cleaner for painted and enameled surfaces, woodwork, etc.; use since July 25, '38.

409,312. Hercules Powder Co., Wilmington, Del.; Aug. 6, '38; resin; use since Aug. 3, '38.

409,088. C. B. Dolge Co., Westport, Conn.; July 30, '38; preparation for cleaning and clearing stopped-up drain and sewer pipes; use since June 14, 1921.

409,097. Johns-Manville Corp., New York City; July 30, '38; sheet material made from Portland cement and asbestos fibres for use as wall boards and construction of casings for dry ovens, furnaces, etc.; use since May 6, '38.

409,115. Sunshine Soda Co., New York City; July 30, '38; cleansing powders and compounds having soda as a base; use since May 16, '35.

409,277. Cyrus E. Manniere (Solvent Products Co.), New York City; Aug. 5, '38; washing fluid; use since July 18, '38.

409,289. Swan-Finch Oil Corp., New York City; Aug. 5, '38; lubricating oils and greases; use since May 7, '38.

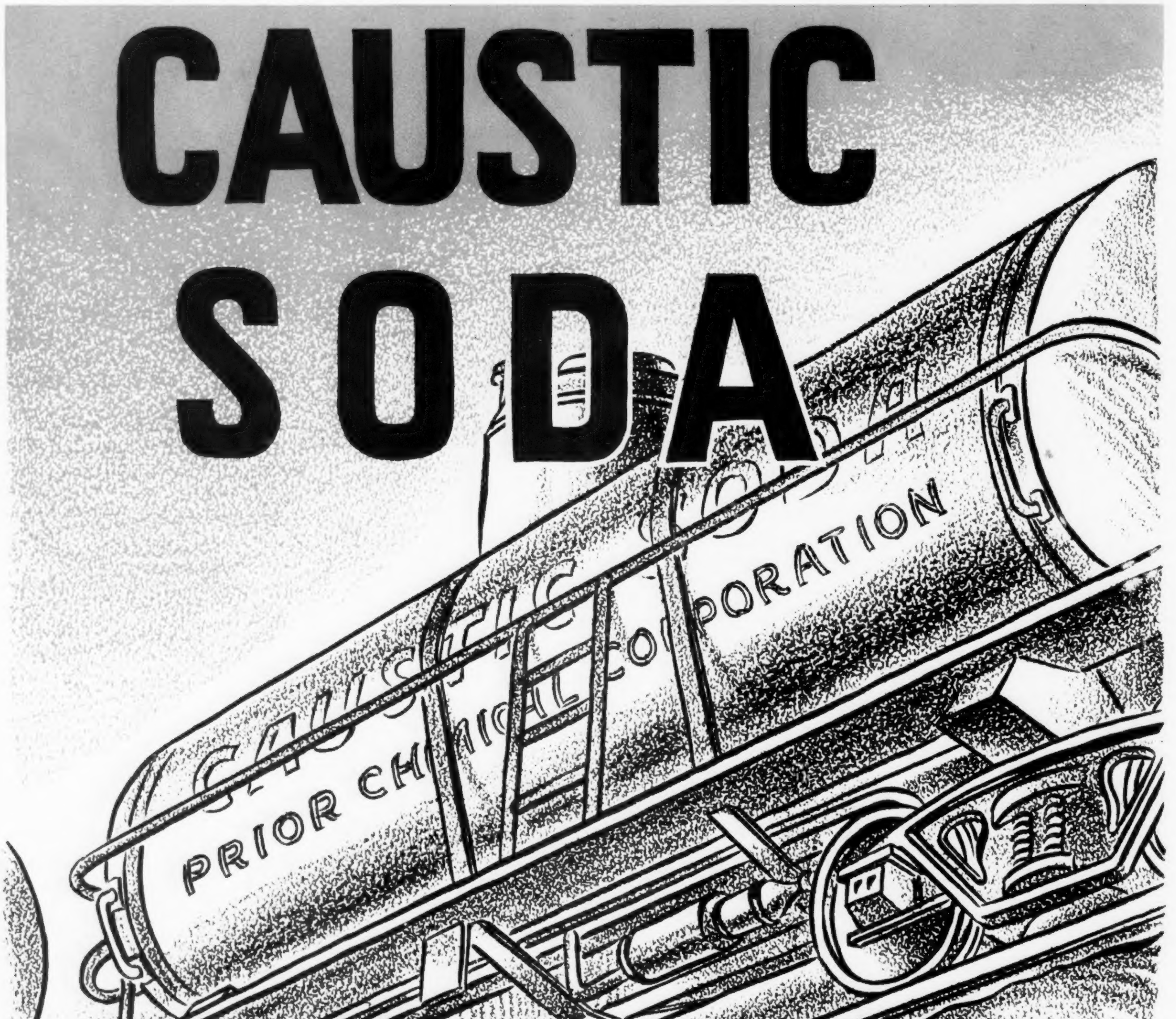
409,313. Hercules Powder Co., Wilmington, Del.; Aug. 6, '38; resin; use since Aug. 3, '38.

409,354. General Chemical Co., New York City; Aug. 8, '38; reducing agent for use in textile and other industries; use since June 27, '38.

409,474. Krom Laboratories, Inc., Kingston, N. Y.; Aug. 11, '38; wax preparations for floors; use since July 30, '35.

409,484. Penick & Ford, Ltd., Inc., New York City; Aug. 11, '38; laundry starch; use since Nov. 6, '37.

409,625. Joseph A. Schulte, Jr., (Etsul Synthetic Prods.), Detroit, Mich.; Aug. 15, '38; household and industrial cleaning solvent compound; use since July 6, '38.


CAUSTIC
SODA
CAUSTIC SODA
PRIOR CHEMICAL CORPORATION
PRIOR CHEMICAL CORPORATION
420 LEXINGTON AVENUE, NEW YORK

"Twenty Years Ago"

Lt. Carl H. Hazard, C. W. S., now chemical advertising specialist and president of Hazard Advertising Corp.

John S. Beekley was 2nd Lt., 149th F. A., attached air service, A. E. F., 1917-19; at present manager, Process Section, du Pont's Ammonia Dept.

Capt. Thos. R. Davies, U. S. A., 1917-19, now president and general manager, Davies Nitrate Co.

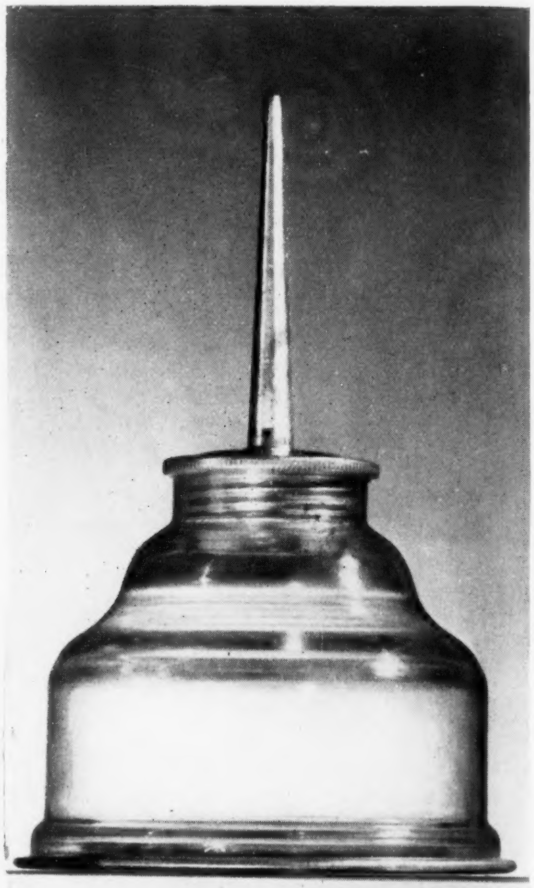
Below, Alton L. Kibler, joined the U. S. Army, Ordnance Dept. in 1915 as chief chemist, stationed at Picatinny Arsenal, N. J.; after the War was transferred to the C. W. S., and is now chief of the Information Division of that branch.

Lt. Berrien C. Eaton, Headquarters Troop, 85th Division, A. E. F., 1917-1918, today is president of Eaton-Clark Co.

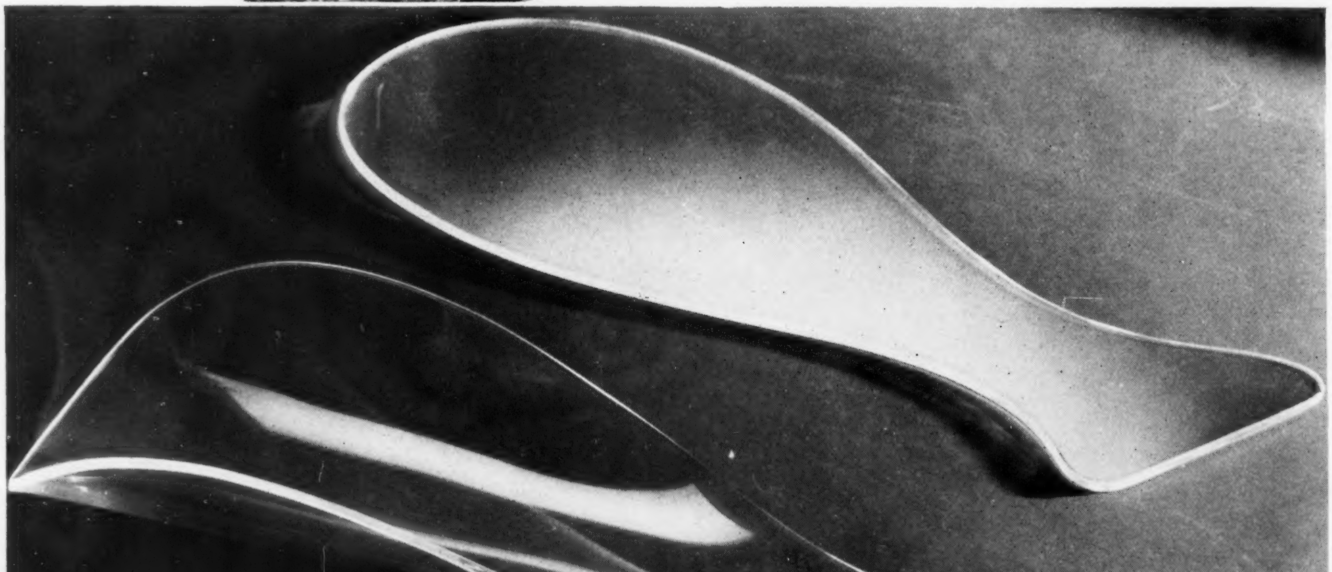
Left, Capt. E. J. de Pree, Artillery, A. E. F., 1917-18, now plant manager for Monsanto.

The Latest Ideas in Plastics

Vue-pak, a new transparent packaging material, developed for many types of merchandise, has been adapted to this Acme bait trap to lure unwary minnows. Made of Monsanto cellulose acetate, the trap is light in weight and unbreakable.



Colorful, transparent plastic oil cans were chosen for top honors in the Novelty Group of the Third Annual Modern Plastics Competition. Aptly termed "Scan" cans, this award covers both the home and industrial oil cans, developed and molded by Universal Plastics Corporation.



Medical science is aided by this plastic splint made from Lucite, which won first award for du Pont in the Scientific Group of the Third Annual Modern Plastics Competition, sponsored by *Modern Plastics Magazine*. In replacing former metal, plaster or wood splints for holding bone breaks or fractures in place in the finger, upper arm or leg, it is now possible to observe the skin and wound without removal from the member, and also to take clear and accurate X-ray pictures through the splint.

"Gears" IN THE CHEMICAL INDUSTRY

SHARPLES TRADE MARK SOLVENTS

CHEMICAL manufacturing is inseparably geared to research as a source of new and improved products.

The raw materials for your process must be selected with the same care exercised in designing the equipment itself. In the list of Sharples Synthetic Organic Chemicals you may find the "chemical cog" you need. If not, perhaps we can "design" it for you.

Let's talk it over—at your convenience—without obligation or cost.

*Pentasol (Pure Amyl Alcohol)
*Pent-Acetate (100% Amyl)
Normal Butyl Carbinol
Isobutyl Carbinol
Sec-Butyl Carbinol
Methyl Propyl Carbinol
Diethyl Carbinol
Dimethyl Ethyl Carbinol
Tertiary Amyl Alcohol
*Pentaphen (p-Tertiary Amyl Phenol)
Diamyl Phenol
Ortho Amyl Phenol
Monoamylamine
Diamylamine
Triamylamine
n-Monobutylamine
n-Dibutylamine
n-Tributylamine

Monoamyl Naphthalene
Diamyl Naphthalene
Polyamyl Naphthalenes
Mixed Amyl Naphthalenes
Normal Amyl Chloride
Normal Butyl Chloride
Mixed Amyl Chlorides
Dichloropentanes
Amyl Mercaptan
Diamyl Sulphide
*Pentalarm
Amylenes
Diamylene
Amyl Benzenes
Diamyl Ether

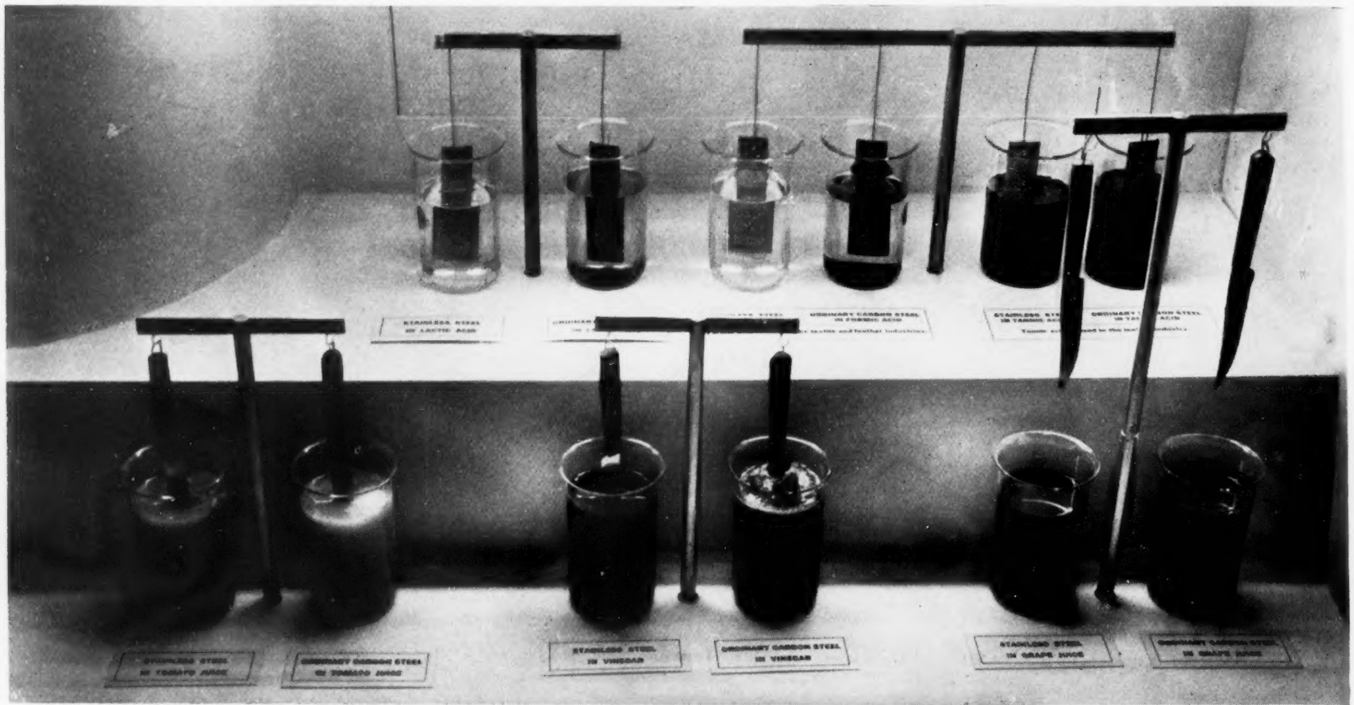
SEMI-COMMERCIAL PRODUCTS
LABORATORY PRODUCTS
*Trade Mark Registered

THE SHARPLES SOLVENTS CORP.

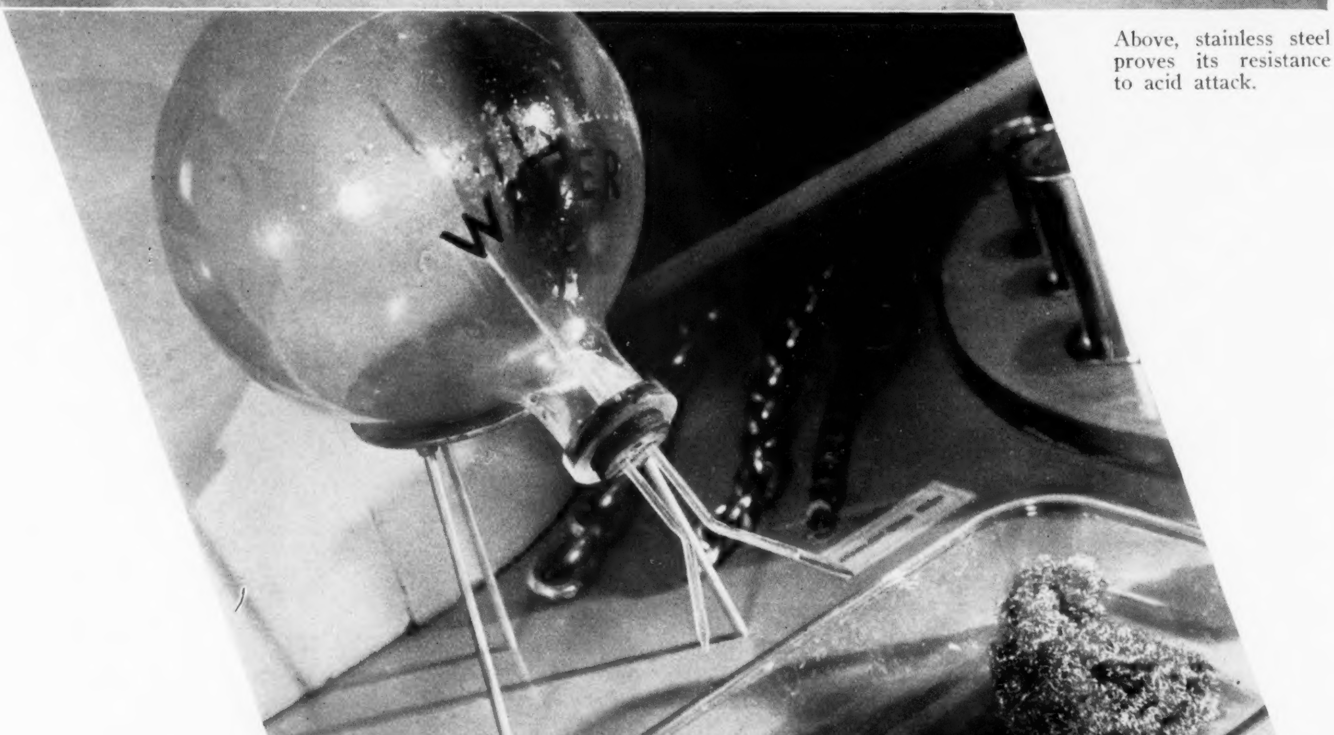
PHILADELPHIA • • CHICAGO • • NEW YORK

"Steels of Today and Tomorrow"

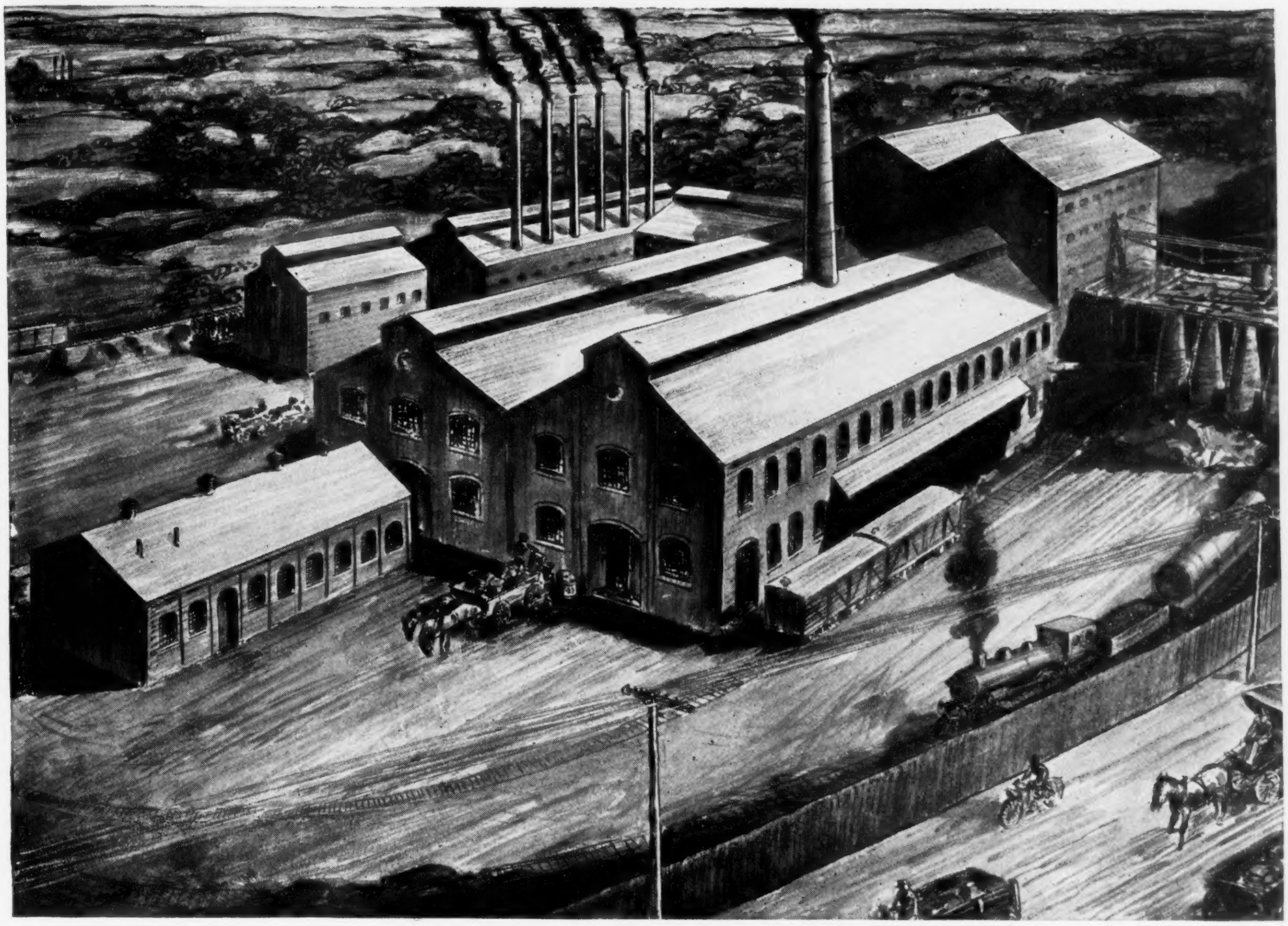
The exhibit sponsored by Allegheny Ludlum Steel Corp., at N. Y. Museum of Science and Industry, Rockefeller Center, demonstrates the valuable contribution made by the newer steels to higher standards of living and in the development of new and improved products.



Above, stainless steel proves its resistance to acid attack.



This exhibit contrasts effect of water on stainless sponge (right) with ordinary sponge (left).



VIEW OF ORIGINAL PLANT IN 1900

Through The Centuries With Alkalies

HERE in 1900 began production of COLUMBIA Soda Ash. Quickly the plant grew. In 1901 COLUMBIA Caustic Soda was first produced. Important by-products further contributed to rapid growth. In 1936 came the first production of COLUMBIA Liquid Chlorine. The same year saw the development of COLUMBIA Sodium Bicarbonate. Other Alkali and Chemical Products are supplementing this line as fast as man's inventive genius discovers better ways to fill man's ever-increasing needs.

OUR PART is humble; our products unromantic. But in the making and processing of many of the oldest, most useful, most necessary commodities on earth they play a vital part. Upon the quality of our output depends the quality of innumerable productions. Glass is clearer; paper is whiter; textile fibres are finer; even the bread we eat and the water we drink are purer, because of the way we do our part. So, accepting this responsibility, we serve the needs of industry with faithfulness and zeal, vigilantly maintaining exacting standards which permit no compromise with quality—and never will.

COLUMBIA

SODA ASH
CAUSTIC SODA
SODIUM BICARBONATE
MODIFIED SODAS
LIQUID CHLORINE
CALCIUM CHLORIDE

THE COLUMBIA ALKALI CORPORATION

THE COLUMBIA ALKALI CORPORATION

BARBERTON • OHIO

NEW YORK	CHICAGO	BOSTON
ST. LOUIS	PITTSBURGH	CINCINNATI
CLEVELAND	MINNEAPOLIS	PHILADELPHIA

HUGE RAYON EXPANSION

Textile Plants for Production of New Synthetic Fibers Planned by du Pont and Celanese—A. I. Ch. E. Holds 31st Annual Meeting—A. C. S. Nominates—

Construction of a textile yarn plant to cost at least $7,000,000, with a site in lower Delaware (Seaford), is to be started shortly by du Pont. The *new* revolutionary, widely heralded Nylon synthetic fiber will be made at the new plant.

On the heels of the du Pont announcement came one last month from Celanese Corp. of America that it would build a $10,000,000 synthetic yarn plant at Petersburg, Va. An entirely new yarn will be produced.

Hosiery is virtually the only division of textiles in which rayon has not yet made serious inroads. Hosiery, especially for women, has remained almost exclusively an outlet for raw silk because synthetic yarns produced up to now have been too lustrous, too inelastic and insufficiently sheer for production of hosiery for the American market.

So great have been rayon's inroads into the raw-silk market that relatively minor quantities of silk are used in fields other than hosiery. Trade estimates are that of the $100,000,000 worth of raw silk imported annually to this country, about $75,000,000 worth was used for hosiery.

Officials of Celanese refused to amplify the mere announcement of the new plant to make a new yarn. It was reported in the trade, however, that it would compete with the new du Pont Nylon yarn, on which experiments have been made for several months.

First introduction of women's hosiery manufactured from the new du Pont fiber, designated as Nylon, will probably be made at the World's Fair next year.

Du Pont chemists consider their new material to be one of the most important developments in the history of research in the U. S. While it has hundreds of possible uses, the field upon which it may have the most revolutionary effect is silk hosiery. Hitherto little fine hosiery has been made from any material other than silk. Nylon textile fibres possess remarkable strength, said to be greater than silk; it is more elastic than any natural fibre, and can be drawn into finer filaments. It can be dyed with any of the usual silk wool or acetate dyes and has a beautiful lustre and therefore eventually may replace silk for hosiery.

Nylon fibre is not a rayon, since it is not made from cellulose, but is a purely synthetic material which has coal, air and water as its starting materials.

A statement by the company says:

"The new synthetic material is the outgrowth of research that has covered the better part of a decade. Its objective was the synthesis from readily available native raw materials of a wholly new group of chemical compounds capable of meeting definite deficiencies in many existing industrial materials that in the main are now imported.

"For several months a pilot plant has been operating near Wilmington to produce small commercial quantities of nylon yarn and toothbrush bristles made from nylon. As the output of the pilot plant is limited, nylon will not be widely available until the Seaford plant is operating.

"Like natural silk, nylon is a polymide having a protein-like structure. Filaments of extreme fineness can be spun—much finer than the filaments of silk and rayon. The dyeing of nylon presents no particular difficulty.

"Of particular promise among the prospective uses for nylon is high twist yarn for fine hosiery. Hosiery made of nylon possesses extreme sheerness, high elasticity, high strength, and improved resistance to runs.

"Sewing thread and knit goods also afford attractive outlets. Among other potential uses which number hundreds, are brush bristles, racquet strings, fishing lines and leaders, narrow fabrics, woven dress goods, velvets, knitted and woven underwear, transparent wrapping film, plastic compositions, textile finishing agents, and coated fabrics.

"The nylon business will be conducted by the Nylon Division, Rayon Dept. of the du Pont Co."

Cotton Manufacturers Concerned

The cotton textile industry is reaching the point where it may be compelled to open its gates to the invader rayon, and join forces with rayon trade associations, Dr. Claudius T. Murchison, president of the Cotton Textile Institute said at the annual meeting of the Institute last month.

The advance of science and technology and the new and growing government regulation of the industry and of the cotton grower have produced a new state of affairs which must be recognized by cotton manufacturers.

Although only a few years ago the silk industry was a separate entity, Dr. Murchison said, today most silk manufacturers depend upon rayon for the major part of their business, in fact about 80% of the so-called silk industry is really rayon. Rayon has also overlapped a substantial and increasing percentage of the cotton industry.

As a result, he said, the time may come when the Cotton Textile Institute, the Rayon Weavers Association and the National Federation of Textiles may find it wise to unite their activities on a co-operative basis.

"King cotton has been knocked to the mat before, but previously at the count of 3 or 4 he has been able to stagger to his feet," Dr. Murchison declared. "Comparatively speaking, he is now down at the count of 8 and with practically no signs of life. Over 8 million bales are in the government hock shop with other millions coming up. Foreign markets, hitherto accustomed to take 50% to 60% of our output, are slowly, relentlessly, perhaps permanently closing their gates."

Vinylite Basis of New Fiber

From other sources it was revealed that Vinylite, produced by Carbide & Carbon, probably will be the basic element in the new Celanese fiber.

A. I. Ch. E. At Philadelphia

The 31st annual meeting of the American Institute of Chemical Engineers opened Nov. 8 at the Benjamin Franklin Hotel, with President Fred C. Zeisberg, a du Pont executive, presiding at the first session. Attendance was 600.

Among the speakers were Dr. Frank Baldwin Jewett, vice-president of American Telephone & Telegraph and recipient of the 1939 John Fritz Gold Medal, highest of American engineering honors. Dr. Jewett traced the influence of the patent system on the past and future of American industry.

Dr. C. M. A. Stine, vice-president of du Pont advocated a new system of engineering education whereby a student will be trained along lines of research, plant operation, or administrative engineering, depending upon certain aptitudes revealed during the beginning of his course.

Studies of the relation of various chemical industries to the business cycle will be presented by Dr. D. P. Morgan, research analyst of Scudder, Stevens & Clark.

Dr. George Edgar Vincent, prominent sociologist and former president of the University of Minnesota and the Rockefeller Foundation, N. Y. City, discussed the growing social responsibilities of industry.

Our Future Leaders

To discuss with industrialists the demands industry will make on its future leaders, 250 young chemical engineers from all parts of the U.S., representatives of college and university chapters of the A.I.Ch.E., convened in Philadelphia during the convention for a two-day session as guests of the University of Pennsylvania. To contribute industry's part of the discussion were 50 executive engineers from leading chemical companies including Carbide, du Pont, American Cyanamid, Standard Oil Development, Dow Chemical,

Hercules Powder, Philadelphia Quartz, Charles Lennig & Co. and others.

After inspecting industrial plants in the Philadelphia area, the young engineers were addressed by Dr. C. M. A. Stine, of du Pont, on "Opportunities in Industry for Men Trained in Chemical Engineering". Other talks were given by Dr. A. E. Marshall, consulting chemical engineer of N.Y. City, Dr. A. B. Newman, head of chemical engineering at the College of the City of N.Y., and Dr. Harrison E. Howe, editor of *Industrial & Engineering Chemistry*. The meeting finally broke up into small groups composed of students and industrialists for the purpose of personally acquainting the young engineers with the job that lies ahead of them as our present leaders see it.

A. C. S. Nominations

Fourteen candidates have been nominated for the presidency of the A. C. S., it was announced recently by Dr. Charles L. Parsons, secretary. Nominations were made by the Society's local sections. Nominees will be voted upon in a poll of the Society's 23,000 members. The 4 receiving the largest number of votes will go before the Council, governing body of the Society, for election.

Winner will become president-elect of the Society on Jan. 1, '39, and president on Jan. 1, '40. Prof. Charles A. Kraus of Brown University, now president-elect, will be president during '39, succeeding Dean Frank C. Whitmore of Penn. State.

The list of candidates follows:

Earle M. Billings business and technical personnel director of the Eastman Kodak, Rochester, N. Y.; Prof. H. S. Booth of Western Reserve University, Cleveland; Gustav Egloff, director of research of the Universal Oil Products, Chicago; Gustavus J. Esselen, president of the Gustavus J. Esselen, Inc., Boston; Francis C. Frary, director of research of the Aluminum Company of America, New Kensington, Pa.; Per K. Frolich, director of the Chemical Laboratories of Standard Oil Development, Elizabeth, N. J.

Also Prof. Harrison Hale of the University of Arkansas; Prof. W. D. Harkins of the University of Chicago; Prof. Samuel C. Lind, dean of the Institute of Technology of the University of Minnesota; E. Emmet Reid, emeritus professor of chemistry in Johns Hopkins University; Walter A. Schmidt, president and general manager of the Western Precipitation Co., Los Angeles; Prof. Hugh S. Taylor of Princeton University; Ernest H. Volwiler, vice president of Abbott Laboratories, Chicago; and Prof. Hobart H. Willard, University of Mich.

National Agrol Formed

First step in a national expansion of the power alcohol industry was disclosed last month when the National Agrol Co., N. Y. City, announced it had purchased the plant of Atchison Agrol Co., Atchison, Kans. John Orr Young, president of the Atchison corporation has also been elected president of National Agrol. The latter was recently incorporated in Delaware with a capital of $5,100,000 and is now exclusive business agent for the Chemical Foundation on the production and sale of power alcohol.

Johnson, Richberg-A. P. I. Speakers

Two former administrators of the National Industrial Recovery Act, General Hugh S. Johnson and Donald R. Richberg, will be guest speakers at the 19th annual meeting of the American Petroleum Institute to be held Nov. 14 through 18 in the Stevens Hotel at Chicago. Mr. Richberg will speak at the first general session, scheduled for the afternoon of Wednesday, Nov. 16, and will share the program with President Axtell J. Byles, of the Institute. General Johnson will speak at the second general session on the afternoon of Thursday, Nov. 17. A second address that afternoon will be delivered by J. Howard Pew, of the Sun Oil Co., Philadelphia.

To Enlarge Scope of Activity

Plans for the formation of an inter-industry committee and the broadening of the present public relations committee of the Drug and Chemical Section of the N.Y. Board of Trade are said to be under way. New committee will serve as a central clearing house for statistical data.

The nominating committee late in the month presented the following slate to the association:—for president, Joseph M. Wafer, assistant sales manager, Industrial Chemical Sales Division, West Virginia Pulp & Paper; for vice-president, Bart F. Sheehan of du Pont's N.Y. Grasselli division; for treasurer, DeWitt Thompson, Mathieson Alkali; and for secretary, C. Oscar Lind, Dow Chemical.

Coming Meetings

Annual meeting of the Association of Official Agricultural Chemists will be held in Washington on Nov. 14-16 at the Raleigh Hotel. . . . The next annual meeting of the Association of Southern Agricultural Workers will be held in New Orleans Feb. 1-3, '39.

Packaging Machinery Makers To Meet

The Packaging Machinery Manufacturers Institute will hold its 6th annual meeting at the Westchester Country Club, Rye, N.Y., on Wednesday, Nov. 16. Such vital subjects as patent problems, wages and hours legislation, selling expenses and overhead charges will be discussed. A cocktail party will precede the banquet.

Study of Ceramics

The Ceramics industry is discussed in the November issue of *Priorities*, published by Prior Chemical Corp., N. Y. City. The article indicates the essentially chemical nature of the pottery business and shows that it embraces a variety of products not usually thought of as belonging to the field of Ceramics.

Obituaries

Russell John Hawn, vice president of Monsanto Chemical Company, died Oct. 14 at his residence in Mountain Brook Parkway, Birmingham, after an illness of several months. He was in charge of operations of Monsanto's phosphate division, which has plants in Anniston, Ala., Columbia, Tenn., Camden, N. J., and Carondelet, Mo. He was recognized worldwide as an authority on the manufacture of phosphorus and its application and had been active in the advancements in the phosphorus field made in the last few years by Monsanto.

Funeral services were held at 3 p.m., Sunday, Oct. 16, at his residence. A group of St. Louis officers of Monsanto headed by Edgar M. Queeny, president, and Charles Belknap, executive vice president, attended.

Mr. Hawn was born March 8, 1878, in Stevens Point, Wisc. He became a resident of Birmingham in '22. During his business and engineering career, he had been associated in the cement business with Lindley C. Morton, and had been vice president of Swann, acquired by Monsanto in '35.

Sir Robert Mond

Sir Robert Mond, 71, of the International Nickel Board, died Oct. 22 at his Paris residence. He came to Paris recently for treatment of a stomach ulcer and had been in a critical condition for a week.

Sir Robert, who received his knighthood in '32, was the eldest son of the late Dr. Ludwig Mond, a native of Germany, who became a naturalized British subject. His father, a generous contributor to scientific research, was one of the leading British chemical manufacturers and inventors of his time.

The son, too, became internationally known for his financial aid to various scientific projects, particularly Egyptian exploration, as well as for his prominence in the nickel industry.

The late Lord Melchett was a brother of Sir Robert.

Robert L. Smith

Robert L. Smith, 82, retired vice-president of the Dooner-Smith Chemical Co., Newark, N.J., died at his home, 45 Goldsmith ave., on Oct. 25.

Born in Newark, a son of George T. and Mary Murphy Smith, he was educated in the Newark public schools. He was a member of the Dooner-Smith Co. 25 years.

Charles H. Osgood

Charles H. Osgood, 67, with the American Agricultural Chemical for many years, on Oct. 21, following an operation for an internal ailment.

News of the Specialties

Refuses to Review "Chipso" Litigation

U. S. Supreme Court Refuses to Review P. & G.'s Suit Against Commissioner of Patents—National Association of Insecticide & Disinfectant Manufacturers Picks N. Y. for '39 Mid-Year Meeting—Arnold, Hoffman Appoints New Representatives—Other News of the Specialties Manufacturers—

The soap industry held most of the spotlight in the chemical specialties field in the past month. Latest development in the long, bitter and involved litigation that has thrown the household division of the industry into a dog fight was the refusal of the U. S. Supreme Court to review the case of P. & G. versus Coe, in which the Circuit Court of Appeals for the District of Columbia refused to enjoin the Commissioner of Patents from cancelling the trademark, "Chipso," following his decision under the Trademark Act, until termination of litigation in a federal court on the question of whether a counterclaim for cancellation under the act was properly dismissed. The Circuit court refused to intervene in an administrative act holding that there was no proof that the proposed act of the Commissioner of Patents was illegal.

Patent litigation for a period of nearly 7 years has marked the developments in the lucrative flake and bead fields, and has involved the 3 giants—P. & G., Colgate-Palmolive-Peet, and Lever Brothers. Flake soaps made their big entrance into American homes in the early '20's. Hailed as a still greater achievement, soap beads burst on the market when Colgate introduced Super Suds in '27. P. & G. hit the market with Selox and Lever with Rinso. Patent suits followed closely with Colgate and P. & G. lined up against Lever. Lever took the first round, but lost on appeal and a year ago the Supreme Court refused the case.

The whole situation became more involved rather than clarified when last year Bertram W. Coltman of Chicago entered suit against Colgate, claiming an early patent of his was being infringed. Colgate has entered an appeal against the unfavorable decision in the Coltman suit. P. & G. now has also been drawn into the battle for Coltman has entered suit, alleging that there is joint ownership between Colgate and P. & G. of the Lamont patent.

The struggle over the Chipso trademark opened up in '31 when P. & G. started action against the J. L. Prescott Co., alleging that Prescott's liquid bleach Oxol infringed on its Oxydol soap. The Prescott Co. retaliated with the claim P. & G. had infringed the Prescott trademark of "Chase-O" by using the name "Chipso." In the lower court the litigation ended in a draw and appeals are now pending. The Court of Customs & Patent Appeals has added still another angle by refusing to register the trademark Oxol on the grounds its origin likely would be confused in the public mind with Oxydol.

Tide Magazine (Nov. 1) in a lengthy review of the whole story from the merchandising angle sums up the current status:—"The Oxydol trademark is registered, the Oxol trademark is not: Chase-O is registered, Chipso, though once registered, has been ordered cancelled."

N. A. I. D. M. Picks N. Y.

The lure of the World's Fair in N. Y. City next summer was sufficient for the National Association of Insecticide & Disinfectant Manufacturers to break a precedent and the June, '39 meeting will be held at the Biltmore on June 5-6. The same hotel will play host during the December, '38 meeting, scheduled for the 5th and 6th. For the latter John Powell is in charge of arrangements, W. J. Zick is in charge of the program, and L. J. LaCava, J. B. Magnus, and Charles Opitz will see to the entertainment features.

New M. F. M. A. Specifications

The Maple Flooring Manufacturers Association has announced that new specifications for heavy duty finishes and gymnasium finishes for use on maple, beech and birch flooring will become effective Jan. 1, 1939. Copies became available Nov. 1 either from the association at 332 S. Michigan Ave., Chicago, or the official laboratory, Foster D. Snell, Inc., 305 Washington St., Brooklyn, N. Y.

New Ahco Representatives

Arnold, Hoffman & Co., Inc., manufacturers and distributors of chemicals and industrial specialties, with main office in Providence, R. I., and plant in Dighton, Mass., announces appointment of two new district sales managers—Robert E. Buck for the Greenville, S. C., territory, and Harold T. Buck for the Columbus, Ga., territory. Robert E. Buck will have his headquarters at P.O. Box 904, Greenville, S. C. Harold T. Buck's address will be P. O. Box 843, Columbus, Ga.

Lavanburg Directors Elect 5

The board of directors of the Fred. L. Lavanburg Co., Inc., Brooklyn dry color manufacturers, at a meeting on Nov. 1 elected the following officers:—Executive vice-president and general manager in charge of operations, Seldon G. Hait; vice-president in charge of Metropolitan sales, Jacob Ebert; vice-president in charge of factory production, Austin J. Farrey; vice-president, Jacob Bloch; secretary and treasurer, E. A. Terray.

New Specialty Companies

Refined Products Corp., 1000 Narragansett Blvd., Providence, R.I., has been formed with Fred Weller as president, to manufacture textile chemical specialties. Company is already offering Perma-Par, a special softener . . . Clenzall Chemicals, Inc., 3229 Western ave., Seattle . . . The J. R. Chemical Co., 11 Minnesota st., Buffalo, to manufacture and distribute chemicals and chemical products.

Specialty Co.'s Personnel

Victor G. Olsen, chief chemist, Keystone Aniline & Chemical, Chicago, is now a vice-president. He has been with Keystone 20 years. Among his scientific contributions is "Pow," a well-known dry cleaning soap used extensively in the dry-cleaning field. William ("Bill") Perry, also with the concern for many years, has been made general sales manager.

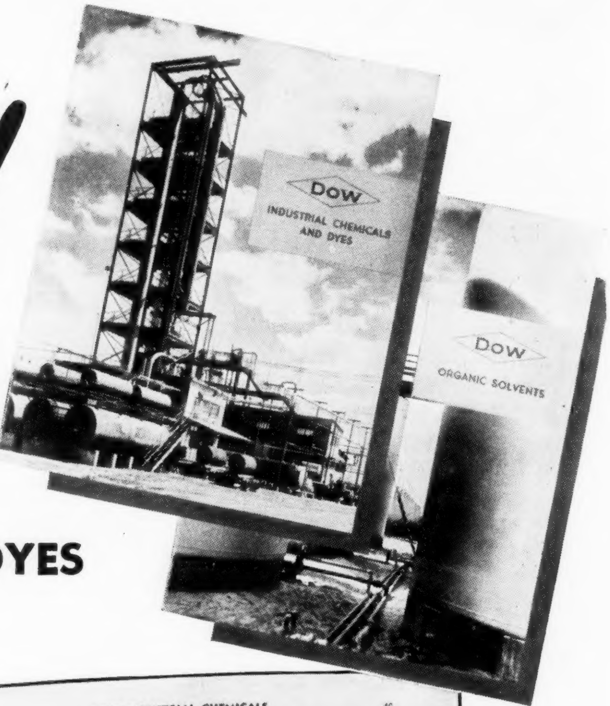
James E. Fenn, formerly with Morningstar, Nicol, Inc., is now chief chemist for Gummed Products Co., Troy, Ohio. . . . O. M. Gibson, a metallurgist with Dodge Brothers Corp., is now head researcher for G. S. Rogers & Co., Chicago manufacturer of chemical specialties for the heat-treatment field.

Specialty Co. News Briefs

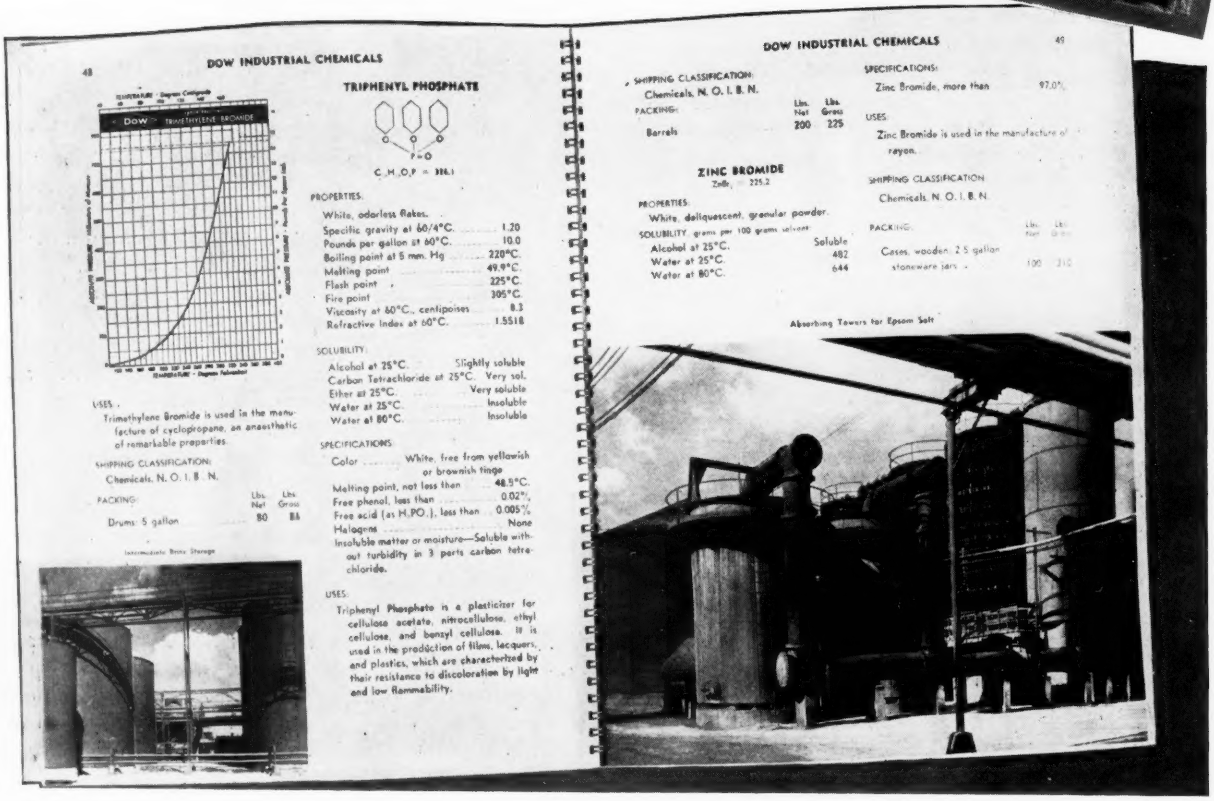
Angier & Earle, Inc., manufacturer of rubber cements, inks, and other specialties, located at 120 Potter St., Cambridge, Mass., changes name to Angier Products, Inc. No change has been made in personnel. . . . The Larvex division of Zonite Products takes over the Dri-Brite Co., and will expand advertising appropriation. Zonite has also added a paradichlorbenzene preparation to the Larvex line . . . Reliable Machine Works, 130 W. 29th St., N. Y. City, will act as sales agent for Merchants Chemical on the sale of Malium gas, used in fur fumigation. . . . Merson Products, 109 Greene st., N. Y. City, maker of chemical specialties for the dry cleaning and laundry fields, has enlarged its sales force in order to obtain a more adequate national coverage. . . . The Sahuara Chemical Co., 319 W. Firestone st., Downey, Calif., will enlarge its soap-making facilities.

Just off the Press!

TWO NEW DOW CATALOGS



INDUSTRIAL CHEMICALS AND DYES *and* ORGANIC SOLVENTS



DOW INDUSTRIAL CHEMICALS

48

DOW TRIMETHYLENE BROMIDE

TRIPHENYL PHOSPHATE

PROPERTIES:

White, odorless flakes.

Specific gravity at 60/4°C.	1.20
Pounds per gallon at 60°C.	10.0
Boiling point at 5 mm. Hg	220°C.
Melting point	49.9°C.
Flash point	225°C.
Fire point	305°C.
Viscosity at 60°C., centipoises	8.3
Refractive index at 60°C.	1.5518

SOLUBILITY:

Alcohol at 25°C.	Slightly soluble
Carbon Tetrachloride at 25°C.	Very sol.
Ether at 25°C.	Very soluble
Water at 25°C.	Insoluble
Water at 80°C.	Insoluble

SPECIFICATIONS:

Color	White, free from yellowish or brownish tinge
Melting point, not less than	48.5°C.
Free phenol, less than	0.02%
Free acid (as H_3PO_4), less than	0.005%
Halogens	None

Insoluble matter or moisture—Soluble without turbidity in 3 parts carbon tetrachloride.

USES:

Triphenyl Phosphate is a plasticizer for cellulose acetate, nitrocellulose, ethyl cellulose, and benzyl cellulose. It is used in the production of films, lacquers, and plastics, which are characterized by their resistance to discoloration by light and low flammability.

USES:

Trimethylene Bromide is used in the manufacture of cyclopropane, an anaesthetic of remarkable properties.

SHIPPING CLASSIFICATION:

Chemicals, N. O. I. B. N.

PACKING:	Lbs. Net	Lbs. Gross
Drums: 5 gallon	80	88

Intermediate Brine Storage

DOW INDUSTRIAL CHEMICALS 49

SHIPPING CLASSIFICATION:

Chemicals, N. O. I. B. N.

PACKING:	Lbs. Net	Lbs. Gross
Barrels	200	225

ZINC BROMIDE

$ZnBr_2$ = 225.2

PROPERTIES:

White, deliquescent, granular powder.

SOLUBILITY, grams per 100 grams solvent:

Alcohol at 25°C.	Soluble
Water at 25°C.	482
Water at 80°C.	644

SPECIFICATIONS:

Zinc Bromide, more than 97.0%

USES:

Zinc Bromide is used in the manufacture of rayon.

SHIPPING CLASSIFICATION:

Chemicals, N. O. I. B. N.

PACKING:	Lbs. Net	Lbs. Gross
Cases, wooden: 2.5 gallon stoneware jars	100	210

Absorbing Towers for Epsom Salt

These two completely new Dow catalogs contain a large amount of selected technical information that is invaluable to every buyer and user of chemicals.

Included in the data are over fifty curves and a series of tables summarizing the properties of one hundred and twenty products. The information in these catalogs is carefully arranged for the convenience of the user. Much of the data is not available elsewhere.

Send for your copies of these new Dow catalogs today.

THE DOW CHEMICAL CO., MIDLAND, MICH.

Branch Sales Offices: 30 Rockefeller Plaza, New York City • Second and Madison Streets, St. Louis • Field Building, Chicago • 1400 16th Street, San Francisco • 2260 East 15th Street, Los Angeles

TRADE DOW MARK

Reg. U. S. Pat. Off.

CHEMICALS INDISPENSABLE TO INDUSTRY

Heavy Chemicals

Chemical Makers Writing '39 Contracts

Uneventful Contract Season Appears Likely—Most Items Unchanged From '38 Levels—Solvay Releases Its Alkali Contract Prices—Copper Sulfate at $4.50—Phosphorus Pentoxide Reduced 6c—Caproic Acid and Ethyl Cellulose Lowered—Severe Competition In Silicofluoride—October Industrial Chemical Tonnages At Year's Peak—

The contract season for industrial chemical makers is now in full swing. As was generally expected in the trade practically all of the important items are being offered on contract unchanged from '38 levels. On Oct. 26 Solvay Sales announced that it would write contracts for '39 on soda ash, caustic soda, and chlorine at the prices which it had in effect for '38, for both carload and l.c.l. quantities. Prices for carloads, f.o.b. sellers works, are as follows:—

	Per 100 lbs.
Soda Ash, 58%	
Light, bulk	$0.90
bags, paper	1.05
bags, burlap	1.08
barrels	1.35
Extra light, bulk	.90
bags, burlap	1.08
barrels	1.45
Dense, bulk	.95
bags, burlap	1.10
barrels	1.35
Caustic Soda, 76%	
Solid, drums	$2.30
Flake, drums	2.70
barrels	2.95
Ground, drums	2.70
barrels	2.95
Powdered, drums	2.70
barrels	2.95
*47-49% liquid, seller's tankcars	1.95
*buyer's tankcars	1.925
*70% liquid, seller's tankcars	2.00
buyer's tankcars	1.975
Chlorine	
Single unit tankcars	$2.15
Multiple unit containers—	
3 cars or more	2.30
2 cars	2.55
1 car	3.00

* Basis 76% Na_2O.

Earlier in the month Innis, Speiden reported that it was prepared to accept contracts for chloride of lime on the same price basis that has prevailed this year. The schedule is as follows:—

	Per 100 lbs.
In 800-lb. drums	$2.00
333-lb. drums	2.25
100-lb. drums	2.85

In less than carload lots, 5 packages and more, the prices are 25c per 100 lbs. above the car-lot schedule; for less than 5 packages, the prices are 50c per 100 lbs. above the car-lot schedule.

All prices are f.o.b. Niagara Falls, freight equalized with Wyandotte, Mich., and are subject to the customary 3 months' adjustment clause. The terms are 30 days net, or less 1 % for cash in 10 days.

In addition to the above products the following are unchanged in price: ammonium bicarbonate, sodium nitrite, oxalic acid, anhydrous ammonia, sodium phosphate, acetic acid, sal soda, sodium bicarbonate, and the mineral acids. No information on bichromates was available at the month-end.

Many of the important price changes of the past month were the direct result of shifts in the metals. The advance in copper forced higher prices for most of the copper salts. Tin was much stronger and the derivatives were quoted higher. The set-back of the Chinese forces was largely the reason for the continued advance in antimony. Copperas stocks have been none too plentiful and the bulk quotation is one dollar higher, with increases also in the various packings. Lead arsenate on the Pacific Coast was reduced 1½c and is now on a 11c basis. Severe competition in sodium silicofluoride between domestic producers and importers resulted in further price demoralization. Phosphorus pentoxide is now available at 12c in carlots, as against a former quotation of 18c.

Of more than passing interest was the announcement of the availability of caproic acid in commercial quantities and at a much lower price—35c in drum lots. A substantial reduction in price was also announced for ethyl cellulose. Crude glycerine was weak and reductions were announced for the saponification and soap-lye grades. In view of the distinct weakness in crude there is a bearish attitude on refined glycerine.

Shipments of industrial chemicals were in excellent volume in October, indicating that the revival in most lines of manufacturing is indeed a substantial one. In all probability October tonnages were the best for any month so far this year, yet, in most quarters, a still greater improvement is expected during November.

Heavier Chemical Consumption Likely

The outlook in the large chemical consuming industries continues to brighten and the fall and winter months will likely see heavy tonnages of industrial chemicals moving into consumers' hands. Newsprint production in North America in September showed a gain of approximately 22,000 tons over August, but was 23.4% under the '37 month. August had shown a decline of 30% from a year ago and July was off 32.2% from the like '37 month. Hosiery shipments in August were higher than for any August in the history of the industry, being 37.2% over July and 9.3% over August of last year. The hosiery trade believes that anticipation of the wages and hours law accounted for a sizable part of the record August output, but, nevertheless, looks for continued heavy shipments for several months.

Important Price Changes

ADVANCED	Oct. 31	Sept. 30
Antimony (metal)	$0.12¼	$0.11¾
Copperas (bulk)	14.00	13.00
Copper carbonate 52-54%	.14½	.14
Copper chloride	.13	.12½
Copper metal	.11¼	.10¼
Copper nitrate	.168	.166
Copper oxide (black)	.16¾	.15½
(red)	.16¾	.15½
Copper sulfate	4.50	4.40
Sodium stannate	.31	.30
Tin crystals	.36	.35
Tin metal	.46	.44½
Tin oxide	.50	.48
Tin tetrachloride	.23½	.22½
DECLINED		
Glycerine, saponification	$0.08⅞	$0.09½
soap-lye	.08	.08½
Lead arsenate (W. Rocky Mts.)	.11	.12½
Sodium silicofluoride (dom.)	.04¾	.05
(imported)	.04¼	.04½
Sulfur, crude, mines	16.00	18.00
Phosphorus pentoxide	.12	.18

September rubber use showed a dip of 1% from the August figure and was 13.93% below September a year ago. Cotton mills used 534,037 bales in September against 601,305 in the like '37 month. There were 22,188,618 spindles active during the month as compared with 23,888,686 for September, '37. Cotton spindles were operated during September at 72.8% capacity as compared with 76.2% for August and 82.3% for September a year ago. In the automotive field with its large consumption of plating chemicals a million car quarter is now anticipated for the final 3 months of '38.

Lowers Phosphorus Pentoxide Price

Tonnage production of elemental phosphorus by Monsanto's Columbia, Tennessee plant has made available pure, dry phosphorus pentoxide in such quantities that the price in carload lots has been lowered from 18c to 12c a pound, R. F. Richard, general manager of sales, Phosphate Division, announced Oct. 7.

"Lowering the quantity price by a third immediately opens the way for new and greater uses of this phosphorus product," Mr. Richard said, "and Monsanto and many industrial research laboratories have projects under development for its application."

Phosphorus pentoxide now is used principally as a drying agent in various industrial processes, in the manufacturing of vegetable oils for cooking and in the making of other phosphorus compounds such as phosphorus oxychloride, which is used in the making of plasticizers for plastics.

Fine Chemicals

Mercury Declines In Light Trading

Acetylsalicylic Acid, U.S.P. Salicylic Acid, and Methyl Salicylate Quoted Lower—October Fine Chemical Volume Up Slightly—Strychnine Salts at Higher Levels—Citric Acid Firm—Tartars Quiet—

A somewhat broader buying movement was reported in the markets for fine chemicals, aromatics, essential oils, and pharmaceuticals in the past month. Seasonal items were in better demand. The outlook over the balance of the year is encouraging.

After a long period of price stability the salicylates were quoted lower. The reductions come just at the time when demand usually increases seasonally. Competition has existed and buyers were largely holding to a hand-to-mouth purchasing policy. The lower levels are expected to stimulate and crystallize sales. The reduction in acetylsalicylic acid amounted to 10c per lb. and the minimum price is now 50c per lb. Prices on U.S.P. salicylic acid were off 5c to a basis of 35c-40c, while methyl salicylate was reduced a like amount and is now quoted at 35c-37c.

Mercury was lower in very light trading, but no changes were made in quotations for the mercurials. The current lack of interest in the metal is generally viewed as being but temporary and any resumption of forward buying is expected to stiffen price immediately. From the Pacific Coast come reports of a decline in production, while in the Eastern markets it appears that sellers are unwilling to make further concessions.

Menthol firmed up somewhat in the final half of the month. This was largely the result of a firmer tone in the primary market. Camphor, on the other hand, was a shade more competitive. All of the principal strychnine salts were advanced sharply early in the month. This was generally expected in the trade. Producers have maintained for a long period that the items were unprofitable.

A 1c advance in ethyl alcohol, placed in effect at the beginning of October, has given a firmer tone to that market. C.P. glycerine was fairly steady with demand only fair, but the weakness in the market for crude grades has exerted a bearish pressure that may have repercussions later. The bismuth and iodine salts were firm and unchanged in price, but tincture of iodine was advanced quite sharply. Cadmium and its salts were slightly easier, but no open announcement of any revisions was made.

A fairly steady demand for citric commensurate with the period of the year was reported by producers and jobbers. Firmness characterized the tartars, but demand was slightly below the level of August and September.

The call for most of the aromatics and the essential oils expanded slightly in the last 30 days. A fair degree of firmness was noted in the price structure of the principal aromatic chemicals.

Chloride Makers File Answers

Columbia Alkali, Dow Chemical, Michigan Alkali, and Solvay Sales early last month filed answers to the Federal Trade Commission's charges of unfair competition in calcium chlorides (See C. I. Sept. p. 311). All 4 companies while admitting in part the allegations of fact deny that the Calcium Chloride Association had any connection with the acts and practices on which the complaint was based. The Association in its own answer also denies any unlawful acts or practices. The Solvay Process Co. also denies all charges and asked that the complaint be dismissed on the ground that the company is not engaged in interstate commerce, merely selling its product at the Syracuse plant to Solvay Sales.

The 9 liquid chlorine producers involved in the FTC complaint issued in January at a hearing on Oct. 5, in N. Y. City, submitted motions asking consent of the commission to withdraw their answers and to file new answers admitting all material allegations of the complaint. Accompanying the motions was a suggested form of findings and order for the commission to issue.

Special Ethylene Dibromide Duty

The Bureau of the Customs has ordered collectors to assess a special countervailing duty of 3.775c per lb. penalty duty on ethylene dibromide brought in from Germany. Order followed a finding that the German Government was supplying to companies a bounty on the exported product.

Water Treatment Lectures

James K. O'Brien, general manager of sales for W. H. & L. D. Betz, Philadelphia water treatment specialists, will give a course of 5 lectures for plant executives, engineers, and chemists on the subject of "The Chemistry of Water" in each of the following cities—Cleveland and Buffalo. Details and dates may be obtained by writing the company at 235 W. Wyoming ave., Philadelphia.

Rea Lectures at Columbia

William Rea, head of the N.Y. advertising agency of that name, is now an instructor in advertising at Columbia. He also lectures on the same subject at Pace Institute.

Important Price Changes

ADVANCED	Oct. 31	Sept. 30
Alcohol, ethyl all packings 1c higher		
Iodine tincture	$1.70	$1.55
Menthol	3.15	3.10
Strychnine alkaloid, cryst.	.50	.40
Powdered	.40	.30
Acetate	.66	.57
Arsenate	.68	.60
Arsenite	.66	.57
Glycerophosphate	.67	.59
Hydrochloride	.66	.57
Hypophosphite	.77	.68
Nitrate	.60	.50
Phosphate	.67	.59
Sulfate, cryst.	.42	.35
Powdered	.32	.25
DECLINED		
Acid acetylsalicylic	$0.50	$0.60
Acid, salicylic, U.S.P.	.35	.40
Camphor	.52	.52½
Lycopodium	.95	1.05
Mercury	73.00	77.00
Methyl salicylate	.35	.40
Podophyllin	4.50	4.75

Seek Library Funds

The library committee of the N.Y. Chemists' Club is now conducting an appeal for funds. During the past year the excellent facilities of the library have been increased and added to largely through the money obtained by this special committee. In '38 a total of $4,852.50 was contributed by 76 companies and individuals. A proposed budget of $7,100 has been adopted and those who care to aid should send their checks made out to the "Chemists' Club Library." Nelson Littell is chairman of the library committee.

Logue With Monsanto

Paul Logue has rejoined the Phosphate Division of Monsanto Chemical, with headquarters in St. Louis. He is well-known in the detergent and milling industries, and was for several years chairman of the Osborne Medal Award Committee of the Association of Cereal Chemists. He is active in that association, also in the A. C. S. and the A. I. Ch. E.

Carbon Bisulfide Recovery

Acticarbone Corp., 62 E. 42 st., N.Y. City, has developed a new process for the recovery of carbon bisulfide in the viscose process. Three installations are now operating satisfactorily.

Dr. Joseph D. White, for the past 8 years at the U. S. Bureau of Standards as a research chemist for the American Petroleum Institute, has joined the technical staff of the W. C. Hardesty Co., Inc., as assistant director of research. Dr. White will be located at the company's Dover, Ohio, plant.

Shortage of Coal-tar Solvents a Possibility

Failure of Coking Operations to Expand as Rapidly as General Business Recovery May Bring Temporary Shortages of Certain Coal-tar Chemicals—Imported Crude Naphthalene Advances to $1.85—Dye Sales Continue to Expand—Contract Prices For '39 Still Unannounced—

Coal-tar Chemicals

Substantial improvement in the coal-tar chemical group was in evidence last month. Nearly all the basic consuming industries, including the rubber, coatings, synthetic resin, textile, and dye divisions, increased their operating schedules, and it appears that consumers' inventories are at an extremely low point.

The more favorable demand for coal-tar solvents was quite discernible and there is now some fear of a shortage in at least certain members of the group. While coking operations have been expanding over the past few months, the rate of acceleration has not kept pace with the gains in steel operation. In other words, the desire to reduce coke stocks has had the effect of slowing up somewhat the output of crudes in relation to present needs. While it is expected that coking operations in the near future will expand at a faster rate there is likely to be some lag for a short period in the availability of many important coal-tar chemicals. Benzol is in heavy demand by the motor fuel trade in the winter months and the rapid expansion in the output of automobiles and tires during the final quarter will cause heavy withdrawals of toluol, xylol, and solvent naphtha.

A complete turn-about-face was in evidence in imported crude naphthalene. Two advances were reported, one for 10c and the other of 35c, bringing the current market to $1.85. Actual trading in crude was light last month, but there was considerable activity in the solicitation of contracts for refined at the lower levels established in September. Demand for phenol was improved when the resin makers increased output to meet the higher production levels now prevailing in the coatings industry. Disinfectant manufacturers were in the market for larger quantities of cresylic. Sales of creosote were somewhat larger, mainly because of the unusual and unexpected requirements of the railroads and utility companies in the New England hurricane area. Quotations on maleic anhydride were reduced 25c for carlots and 26c for l.c.l. quantities. No change was made, however, in the quotations on the powdered material.

Dye sales continued the expansion of the past few months in both the textile and leather fields. As a direct result, intermediates are moving out into consuming channels in larger quantities.

The general consensus of opinion is that October volume was the best so far in the current year and additional expansion in orders is expected over the next 30 days. No announcements as yet on the contract prices have been forthcoming. It is quite evident, however, that producers are firm in their price outlook in view of the steady rise in general business activity.

Light oil recovery during September was reported at 10,869,902 gals., as compared with 10,284,559 in the preceding month and 18,187,875 in September a year ago. In the first 9 months the output only reached 90,992,740 gals., as against 162,998,802 in the same period a year previous.

September tar production reached 33,401,772 gals., as against 31,312,515 gals. in the preceding month and 55,680,327 gals. in September of '37. For the first 9 months of the current year the output was reported at 277,043,189 gals., as against 495,973,674 gals. in the corresponding period of '37. Details of the byproduct coke field for the year 1937 will be found in this month's Statistical and Technical Data Section.

Higher Coking Rate

For 3 consecutive months production of coke has shown an advance over the preceding month. Output of byproduct coke in September amounted to 2,675,000 tons, a gain of 10.8% over the August rate, but a loss of nearly 40% in comparison with September, '37 recovery. September benzol production amounted to 6,056,000 gals., a gain of 8.4% over August, but showed quite a loss from the 10,765,000 gals. reported for September of last year. For the first 9 months of this year benzol output reached 48,841,000 gals., a decided drop from the 93,592,000 in the same period a year ago.

M. C. A. Loses Truck Plea

The Manufacturing Chemists' Association failed last month in its plea to the I. C. C. asking elimination of private trucks from proposed regulations for shipment of explosives and other dangerous materials by motor carriers. Petition asked that consideration insofar as they would apply to privately owned vehicles be postponed. As a result hearings on the proposed regulations were held as originally planned on Oct. 10 in Los Angeles, Oct. 17 in Tulsa, and Oct. 26 at Washington. The American Petroleum Institute joined with the MCA in the petition which was denied. Both Associations in their memorandums suggested that whatever safety regulations are deemed necessary should be applied regardless of whether dangerous articles are being carried, in order that there should not be two different sets of regulations.

Important Price Changes

ADVANCED	Oct. 31	Sept. 30
Naphthalene (crude, imp.)	$1.85	$1.40
DECLINED		
Acid maleic anhydride ..	$0.25	$0.31

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912 AND MARCH 3, 1933

Of *Chemical Industries*, published monthly at New Haven, Conn.

State of Connecticut, County of New Haven, ss. Before me, a Notary Public in and for the State and county aforesaid, personally appeared Williams Haynes, who, having been duly sworn according to law, deposes and says that he is the Publisher of *Chemical Industries*, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, and business manager are: Publisher and Editor, Williams Haynes, 149 Temple St., New Haven, Conn.; Business Manager, William F. George, 25 Spruce St., New York, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent. or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) The Haynes & George Co., 149 Temple St., New Haven, Conn.; Williams Haynes, Stonington, Conn.; William F. George, Bayside, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent. or more of total number of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ——. (This information is required from daily publications only.)

WILLIAMS HAYNES, ***Publisher.***

Sworn to and subscribed before me this 30th day of September, 1938. Anna L. Devlin, Notary Public. (Comm. expires February, 1942.)

Solvents and Plasticizers

Important Price Changes

	Oct. 31	Sept. 30
ADVANCED		
Alcohol C.D. 14 tks.	\$0.26	\$0.23
Drs.	.34	.31
S.D. 1 tks.	.24	.23
Drs.	.30	.29
Special Solvent, tks. ..	.25	.24
DECLINED		
Dibutyl ether	\$0.25	\$0.30
Naphtha, V.M. & P.		
(N.Y. & N.J.) tks.	.09½	.10
Tankwagon, Newark ..	.11	.12½
Petroleum thinner		
(N.J.) tks.	.08½	.09
Tankwagon, Newark ..	.09	.09½
Tricresyl phosphate, tech.	.23	.24½

Alcohol Prices Advanced 1¢

Firmer Prices Based on Higher Molasses Levels—Dibutyl Ether Reduced to 25c—Weakness Develops on Eastern Seaboard on Petroleum Thinners and V. M. & P. Naphthas—Solvents Consumption Increases Rapidly—Favorable 4th Quarter Outlook—

Alcohol prices went through considerable gyrations in the last week of September and the 10th of October. The highly competitive situation which has existed for quite a period culminated in a 2c reduction in completely denatured. This was in a way rather surprising coming as it did at the time when traditionally C.D. prices are supposed to be firm. Actually, of course, the announced reduction was only bringing the published quotations down to the level generally prevailing for some time. On Oct. 10 alcohol producers reversed the price trend, rescinding not only the 2c reduction in C.D., but adding a general advance of 1c to pure ethyl, the special formulas, special solvent, and completely denatured. Firming of molasses quotations was advanced as the principal reason for the move. But it is also a well-known fact that producers were decidedly of the opinion that prices were at a very unprofitable level.

On the latest basis C.D. 14 is 26c in tanks; S.D. No. 1 is 24c; S.D. 23G is 28½c in tanks; special solvent is 25c; while pure in tanks is \$4.50½. The effect of the rising market was a stimulation to heavier buying and the volume in October was reported as being fairly satisfactory to producers.

At the month-end rumors were about in the trade that one producer at least was offering ethyl acetate at 5.1c per lb. as against 5.5c in tanks for delivery after Jan. 1. A new schedule was released on dibutyl ether, the latest quotation being 25c in l.c.l. quantities in drums; 29c per lb. in 5-gal. cans with 2c additional for one gallon packing. The drum price is f.o.b. destination, but no freight allowance on the one and 5 gallon cans. Additional weakness was apparent in tricresyl phosphate and a 1½c decline brought the price down to 23c for technical.

Price stability featured the markets for the various petroleum solvents during most of the 30-day period, but late in the month the northern N.J. tankcar price for petroleum thinners was reduced ½c to a basis of 8½c and tankwagon quotations were lowered a similar amount to a basis of 9c. Tankcar prices in N.Y. for V.M. & P. naphthas were reduced to 9½c, a drop of ½c; a similar reduction was announced for northern N.J., and the tankwagon price at Newark was lowered 1½c, the new level being 11c a gal. Petroleum solvents quotations in the mid-continent area and on the Pacific Coast were steady.

The weakness in some items on the eastern seaboard was the result of continued instability in the markets for crudes and local competitive conditions. The upswing in the coatings industry, the betterment in rubber goods manufacturing are the principal factors in the greatly increased demand for solvents and plasticizers.

Drop in September C. D. Alcohol Output

Ethyl alcohol output declined in September from the figure for the corresponding month of '37, the respective figures being 15,799,687 and 17,219,398 proof gals. The drop in completely denatured was even more pronounced, being 2,619,783 and 4,806,615 wine gals., respectively. September removal of completely denatured amounted to 2,569,815 gals., as against 4,648,767 gals. in the like period of '37. Stocks at the month-end were reported at 865,730 gals., a decline from the 1,142,699 reported on Sept. 30, '37.

Production of specially denatured was 6,561,614 gals., as compared with 6,706,038 in September a year ago. Totals for removal were 6,554,205 and 6,706,038 gals., respectively. Stocks were down slightly, the respective totals being 600,951 and 778,597 gals.

August Cellulose Plastic Statistics

August figures for the production, shipment, and consumption of nitrocellulose sheets, rods, and tubes showed a jump from the July totals, but were still well below the corresponding month of last year. Production and shipments of cellulose acetate sheets, rods, and tubes in August, however, were below July figures, and, of course, well below the totals for August a year ago. For the detailed figures see the Statistical and Technical Data Section (blue pages).

Puerto Rico Butyl Plant

Additional information is now known about the butyl alcohol plant which The Lummus Company of N. Y. City is now constructing in Puerto Rico. It is being built for the Asociacion Azucarera Cooperativa Lafayette, a concern engaged in growing sugar cane and manufacturing it into raw sugar. The Cooperativa owns Central Lafayette, a sugar mill located at Arroyo, Puerto Rico, and the new butyl alcohol plant will operate in conjunction with this mill. Funds for construction of the plant totaling \$550,000 were furnished the Cooperativa by a loan from the Puerto Rico Reconstruction Administration.

The Cooperativa is a private association organized under the cooperative laws of Puerto Rico. Stockholders are members of the Cooperativa Asociacion and no stock is owned by the government. The members of the Asociacion are local land owners who have their sugar cane ground at Central Lafayette. The loan may best be compared to an R.F.C. loan made to any private corporation.

The Cooperativa is building this plant to obtain additional outlets for sugar cane other than the manufacture of sugar. Under the sugar quota system the quantity of sugar they are allowed to manufacture has been greatly decreased from their potential production and the number of men to whom they can give employment, and the acreage they can cultivate has been reduced accordingly. By converting sugar cane into productions other than sugar, such as solvents and chemicals, the Cooperativa can operate their mill without quota restrictions producing their full potential amount of sugar, part of which will be converted into chemicals, and thereby obtaining a greater profit for the Cooperativa and give employment to a larger number of men.

With quota restrictions on sugar, coffee and tobacco, Puerto Rico's principal crops, it is believed that prosperity for the Island may be promoted by developing the manufacture of chemicals and other industrial products from native agricultural materials such as sugar cane. The loan was made to the Cooperativa to aid in the development of such a program.

A butyl alcohol and acetone plant is being erected because Puerto Rico has great natural advantages for the production of these chemicals. Butyl alcohol is now manufactured in the U. S. from hydrocarbon gases and molasses, the principal supplies of which are obtained from Cuba and other foreign countries. This plant will produce 3,500,000 lbs. of normal-butyl alcohol and 1,500,000 lbs. of acetone per year.

Broader Demand For Raw Materials

Spot Inquiries Increase But Buyers Continue Conservative Purchasing Policies—Corn Derivatives Slightly Lower—Varnish Gums Advance—Firmer Tone in Naval Stores—Shellac Markets Quiet—Candelilla Wax Firm—

Natural Raw Materials

A gradual broadening of the demand for natural raw materials was reported from a wide variety of sources. The improvement in most lines of manufacturing was encouraging. While buyers in the main did not abandon their policy of conservative purchasing they were in the market more frequently, indicating that inventories generally are small. Just what their policy will be over the next 30 to 60 days is difficult to ascertain at the moment. Should business activity continue to make steady gains and commodity prices begin to show signs of advancing they will want to cover for longer periods. There is little belief prevailing now that we will see runaway commodity markets in the next few months. The dove of peace over Europe, although slightly battered, has eliminated at least in part the incentive for hoarding.

Price changes last month were almost entirely on the downward side. Corn derivatives weakened slightly early in the month when the basic commodity slumped. The decline in starch, dextrin and tanner's corn sugar, and corn syrup amounted to 10c per 100 lbs. The markets for natural raw tanning materials shifted back and forth within narrow limits, but in the main net losses were the result.

Spot business in the waxes was fair. Steady prices prevailed for the various grades of beeswax, candelilla was very firm, while Japan showed some signs of weakness in the face of light demand. Carnauba quotations were somewhat lower at the month-end as compared to the levels prevailing on Sept. 30. However, at the lower levels the item had all the appearances of decided firmness. Demand over most of the month was not up to expectations, but in the final week interest perked up. Cables from Brazil continue to show price strength.

Price gains were very much in evidence in a number of the varnish gums. A spurt in purchasing by consumers, plus a firmer tone in cables from primary centers changed the complexion of the market from one of weakness to one of firmness.

Shellac prices were without change in the past 30 days. Buying was of a conservative nature. Cable advices from Calcutta and London indicated strength in both markets.

Naval stores took on a firmer tone. Quite a heavy and unexpected demand for turpentine for export was reported from Savannah and Jacksonville. The net changes at Savannah are shown in the following end-of-the-month comparison.

	Oct. 31	Sept. 30	Net Gain or Loss
B	\$3.95	\$3.50	+\$0.45
D	4.00	3.80	+0.20
E	4.25	3.90	+0.35
F	5.10	4.95	+.15
G	5.20	4.95	+.25
H	5.20	4.95	+.25
I	5.20	4.95	+.25
K	5.20	4.95	+.25
M	5.20	4.95	+.25
N	5.65	5.45	+.20
WG	6.00	5.60	+.40
WW	6.45	6.10	+.35
Y	6.45	6.10	+.35
Turpentine ..	24¼c	20½c	+3¾c

Schimmel's New Representatives

Schimmel & Co., N. Y. City, is increasing its outlets throughout the country. Additional representatives have recently been appointed in Cleveland, Cincinnati, and New Orleans to handle the well-known Schimmel perfume compounds, flavors, essential oils, and aromatics. New representatives are K. H. Driggs, 15201 Elderwood ave., E. Cleveland; W. J. R. Alexander, 111 E. 4th st., Cincinnati; and Industrial Chemical & Processing Co., 3901 S. Carrollton ave., New Orleans. They will supplement the branches already established in Chicago, Los Angeles, and Toronto. This expansion, necessitated through increased demand for its aromatics, will result in greater convenience to Schimmel customers.

Elect Nominating Committee

The Salesmen's Association of the American Chemical Industry held its annual meeting in the Chemists' Club, N. Y. City, October 18, with approximately 40 members in attendance. A nominating committee was elected to prepare a list of candidates for the offices and for members of the executive committee. Committee consists of the following:—chairman, Ralph Dorland, Dow Chemical; George Bode, R. & H. Chemicals Division of du Pont; W. J. Weed, Niagara Alkali; Ira Vandewater, R. W. Greeff & Co.; John Enequest, Enequest Chemical; B. M. Spencer, of B. M. Spencer & Co., and Thomas Farrell, of *Drug & Cosmetic Industry*.

Refuses to Review

The U. S. Supreme Court has refused to review the case of Penick & Ford, Ltd., versus the International Patents Development Co., involving the validity of 3 patents for a process of making grape sugar, owned by Corn Products and International Patents Co. Supreme Court also refused to review order of Federal Trade Commission against Biddle Purchasing, involving brokerage clause of the Robinson-Patman act.

Important Price Changes

ADVANCED

	Oct. 31	Sept. 30
Valonia cups	\$31.00	\$30.00
Wax Candelilla	.15¼	.15

DECLINED

	Oct. 31	Sept. 30
Balsam Copaiba	\$0.23½	\$0.26
Corn sugar, tanners	2.95	3.05
Corn syrup 42°	2.89	2.99
43°	2.94	3.04
Dextrin corn	3.30	3.40
British Gum	3.55	3.65
Mangrove bark	24.00	26.00
Myrobalans J1	26.00	29.00
J2	18.00	20.50
Starch, pearl	2.40	2.50
Powdered	2.50	2.60
Sumac, grd.	66.00	68.00
Leaf	69.00	73.00
Valonia beards	46.00	48.00
Wattle bark, bgs. ship.	38.00	39.00
Wax Carnauba		
No. 1 Yellow	.40	.42½
No. 2 Yellow	.39	.41½
No. 3 Chalky	.31	.33½
No. 3 N. C.	.31½	.33½
Japan	.10¼	.10¾
Montan	.11	.11⅜

F.T.C. Activities

Corn Products Refining and its sales subsidiary Corn Products Sales Co., Inc., both of 17 Battery pl., N. Y. City, are charged in a complaint issued by the Federal Trade Commission with violation of the Robinson-Patman Act by discriminating in price between purchasers of corn products of like grade and quality. Complaint alleges that the respondent companies sell such commodities to some purchasers at a higher price than that at which they sell to other buyers competitively engaged with purchasers who pay the higher price. According to the complaint, when Corn Products Refining reduces or advances prices, its competitors similarly cut or raise their prices.

Complaint charges that the respondent companies' discriminations in price are effected through use of delivered prices charged buyers, which prices, while identical in terms of dollars and cents as to purchasers located at any given point of delivery, are discriminatory among buyers located at diverse points of delivery.

Hildebrand-Nichols Medalist

The William H. Nichols Medal of the N. Y. Section of the A. C. S., one of the highest scientific honors bestowed in the U. S., has been awarded for '39 to Dr. Joel Henry Hildebrand, professor of chemistry in the University of California and internationally known for his studies of liquid and solid solutions, it was announced recently by Dr. John M. Weiss, chairman of the medal jury.

Professor Hildebrand will receive the medal at a dinner of the N. Y. Section on March 10.

Fats and Oils

Mixed Price Trends In Fats and Oils

Chinawood Rises on Reports of Japanese Victories—Considerable Concern Felt Over Future Deliveries — Refined Fish Oils Turn Firm—Linseed Tone is Bearish—Edible Oils Generally Firm—

A fair volume of business was transacted in the oils and fats markets last month, according to most sources of information, but here and there disappointment was expressed that a greater degree of expansion in the demand did not take place in view of the improvement in business activity. It appears now that many consumers covered much of their requirements late in September and remained out of the market during October.

The developments in China with Japan finally succeeding in taking Hankow caused a flurry in Chinawood oil. Prices advanced and, for a period, forward commitments were at a standstill. The report of the Dept. of Commerce showing approximately 6-months supply of oil in this country had a bearish effect on prices, for in the trade it was generally believed that stocks were not quite as large as the statistics proved to be. Just what the future trend of prices will be is difficult to analyze. Those who are bullish take the stand that this supply plus very little that may come from Hong Kong will be all that can be counted on over a considerable period and that ultimately a shortage must occur. Others lean to the opinion that the Chinese will manage to get oil through despite the barriers placed in the way by Japan. In any event the market over the next few months and even into early spring should provide much in the way of interest.

Oiticica Moves Up

Oiticica moved up in sympathy with Chinawood. Linseed, however, lost further ground. The downward movement in the refined fish oils was halted last month and higher prices were named for refined menhaden and refined sardine.

An easier tone was in evidence in coconut. Refined oil was in fair demand, but "soapers" were not particularly interested in the market for inedible material. Soybean and corn offerings were light. Demand was not particularly good for inedible grades.

Edible Fats and Oils Supply

A supply of edible fats and oils not much, if any, smaller than the past year's large supply is in prospect for the 1938-39 season, the Bureau of Agricultural Economics reports. The smaller production of vegetable oils this season and a probable big decrease in the output of cottonseed oil is expected to be offset, in large part at least, by the large carry-over of vegetable oils, some increase in production of soybean oil, and a 10 to 15% increase in the quantity of lard produced.

According to reports from Lewes, Del., the menhaden fleets have ended their fishing for the season. Bad weather, poor catches are given as the reasons for the early end of the fishing season by two of the largest companies. Usually the season holds through part of November.

Decline in Linseed Output

Director of the Census, William L. Austin, announces that, according to preliminary figures, there were 22 mills in the U. S. which crushed flaxseed during the quarter ending Sept. 30, reporting a crush of 141,210 tons of flaxseed and a production of 98,407,203 lbs. of linseed oil. These figures compare with 214,649 tons of seed crushed and 151,278,120 lbs. of oil produced for the corresponding quarter in '37; 136,142 tons of seed and 91,805,153 lbs. of oil in '36; 167,952 tons of seed and 116,666,553 lbs. of oil in '35.

Stocks of flaxseed at the mills on Sept. 30, amounted to 84,542 tons, compared with 79,970 tons for the same date in '37; and with 58,345 tons in '36. Stocks of linseed oil reported by the crushers were 79,500,005 lbs. on Sept. 30, compared with 101,918,610 lbs. for the same date in '37; and 54,297,273 lbs. in '36.

September Tung Oil Shipments

Tung oil continued to be exported from China in normal quantities in September, despite military activities in and about Hankow, the Yangtze River port through which the large bulk of the world's tung oil supply normally clears, according to C. C. Concannon, Chief of the Commerce Dept.'s Chemical Division.

It is unofficially reported that a total of 3,650 short tons of oil were declared for export at the Hankow customs office in September and that 3,650 tons were started south over the Hankow-Canton Railway for transshipment at Hong Kong and South China ports during the month.

In the last week of September and the first week of October, it is reported that some 20 carloads of oil left Hankow by water for Changsha and beyond for eventual shipment by rail to South China ports, according to cable advices from Hankow.

Tung oil reported in storage at Hankow on Sept. 30 aggregated 12,500 short tons, an amount far in excess of normal for this season, and the greatest amount reported for any month and in recent years.

Bob Quinn, Mathieson, is back at his desk after having been confined to the hospital for over a month. He is reported feeling much better.

Important Price Changes

	Oct. 31	Sept. 30
ADVANCED		
Oil Chinawood, drs.	\$0.15	\$0.12½
tanks	.15	.118
Lard extra bbls.	.09⅛	.09
extra No. 1 bbls.	.09	.08¾
Menhaden, ref'd alk. drs.	.069	.067
tanks	.063	.061
kettle-bodied, drs.	.078	.076
light-pressed drs.	.063	.061
tanks	.057	.055
Neatsfoot, extra, bbls.	.09¼	.09
Oiticica, bbls.	.11¼	.10½
Sardine, ref'd alkali drs.	.069	.067
tanks	.063	.061
light-pressed drs.	.063	.061
tanks	.057	.05½
DECLINED		
Oil Babassu	\$0.06¼	\$0.06⅜
Coconut, Manila, tks.	.03⅛	.03⅜
tks. Pacific Coast	.02¾	.03
Corn crude, tks.	.06⅝	.07
ref'd, bbls.	.09⅝	.09¾
Linseed, raw, tks.	.0770	.083
Oleo No. 1, bbls.	.09	.09½
No. 2, bbls.	.08¼	.09
Olive (denat.)	.88	.94
Soybean, tks, crude	.05¾	.05⅞
crude, drs.	.0635	.06½
ref'd, drs.	.0755	.07675
Oleo Stearine	.07	.07¾

Hughes Now a Consultant

Charles H. Hughes, for several years research engineer and designer of equipment for Semet-Solvay Engineering Corp., has resigned to establish a consulting engineering service at 270 Broadway, N. Y. City. Mr. Hughes is widely known in the by-product coke oven and gas industries for his work in coal carbonization, carbureted water gas and related processes. He is an authority on refractories and their adaptation to special furnace design.

Others In New Posts

First woman on the Case faculty is Dr. Irene Levis, a former member of the faculty of the University of Frankfort, Germany. She is starting a micro-analytical laboratory.

M. G. B. Whelpley, president, Anglo-Chilean Nitrate, is now also president of Pacific Tin Corp. . . . R. G. Kreiling is now in charge of chemical control for Armour Fertilizer in place of H. C. Moore who now handles purchases. . . . Joseph K. Roberts is now director of research for Standard of Indiana, with Whiting headquarters. T. H. Rogers has been made associate director and is in charge of chemical research. . . . Ernest M. May, who has completed a Ph.D. at University of Chicago, is now researching for his father, Otto B. May, president, Otto B. May, Inc., Newark, N. J.

T. D. Cartledge, formerly assistant general sales manager, has been appointed general sales manager of Linde Air Products, a unit of Carbide.

Agricultural Chemicals

Little Interest In Raw Fertilizer Materials

With Minimum Requirements Generally Covered Mixers Show Little Current Interest in Additional Purchasing—Natural Organics Sink Lower—Crude Sulfur Now $16 a Ton—September Tag Sales Only 1% Below Like Period a Year Ago—Exports, Imports Continue to Decline—

Important Price Changes

	Oct. 31	Sept. 30
ADVANCED		
Ammonium sulfate	$27.50	$27.25
Bone phosphate (unit) ..	.80	.77
Menhaden fish meal	49.00	48.00
Nitrogen Solution	1.04	1.03
DECLINED		
Blood, dried, N. Y.	$2.90	$3.00
Chgo. high-grade	2.85	3.00
Imported	3.05	3.10
Nitrogenous material imp.	2.60	2.65

Government to Make Chlorate?

Government manufacture and sale of sodium chlorate, used in weed eradication, was recommended in a committee report presented to a conference of representatives from 9 states held last month in Des Moines. J. S. Jones, secretary of the Minnesota Farm Bureau Federation submitted the report which stated in part: "We favor the manufacture of sodium chlorate and other chemical agents suitable for weed eradication at one or more of the federally financed hydroelectric plants in the Middle West. . . . such chemicals to be distributed without profit, and preference being given to farmer-owned co-operatives as distributing agencies."

Establishment of a division of weed eradication in the Dept. of Agriculture was also recommended.

To Represent U. S.

Dept. of State has appointed the following as members of an American National Committee to cooperate with the Central Committee on Organization of the 6th International Technical and Chemical Congress of Agricultural Industries which will be held at Budapest, Hungary, in July, '39:—Dr. Henry G. Knight, chief, Bureau of Chemistry & Soils; Charles J. Brand, N. F. A. secretary; Charles C. Concannon, chief, Chemical Division, Dept. of Commerce; James M. Doran of the Distillers Institute; and Charles N. Frey of the Fleischmann Co.

Superphosphate Distribution

On Sept. 28 the AAA announced that applications have been accepted for 62,716 tons of triple superphosphate to be furnished farmers in Eastern and Southern States as grants of aid to be used in carrying out soil-building practices under the 1938 farm program.

The Southern Fertilizer & Chemical Co., Savannah, purchases property on King st., Charleston, S.C., according to President A. D. Strobhar, and will operate a branch factory.

Trading in raw fertilizer materials was at an extremely low ebb in the past 30 days. Mixers, generally, have covered their minimum requirements and because of the uncertainties in the agricultural set-up they are unwilling to obligate themselves further at this time. Some slight increase in sales was expected at the southern meeting of the N.F.A.

Price changes were few. The markets for natural organics were lifeless. Only light offerings prevented larger price declines. An additional 25c a ton was automatically added to the sulfate of ammonia price on Nov. 1. Potashes and phosphates were dull. On Nov. 1 an additional 1c per unit was added to the quotation for nitrogen solution, the new level being $1.04 per unit for tanks, f.o.b. Atlantic and Gulf ports.

The outstanding news, of course, was the $2 reduction in crude sulfur, the first price change since '26. There has been a great deal of speculation over the reason or reasons for this move. One of the most logical is that the sulfur producers were making a smart move to eliminate in part, at least, the incentive for the wider adoption of processes for sulfur recovery and the expansion of methods of employing pyrites and other sulfur-bearing raw materials.

September Tag Sales Off 1%

Total tax tag sales in the 17 reporting states in September were within 1% of September, '37. A small increase was recorded by the South, with 7 of the 12 states in the group reporting larger sales this year than last. Sharpest drop took place in Texas. In the Midwest, where September is one of the peak months, combined sales were 5% under last year. For the first 9 months of the year aggregate sales in the South were 12% under the corresponding period of '37, but 10% above '36. Only state to report an increase over last year is Oklahoma. In the January-September period sales in the Midwest were off 10% from last year. Total tag sales for the entire year '38 will likely be around 12% below last year. It seems probable, however, that the decline in fertilizer consumption for the country as a whole will be somewhat under this. Consumption on the Pacific Coast is holding up well. A 10 or 11% drop in consumption still seems a good estimate, according to N. F. A. statisticians.

August exports of fertilizers and fertilizer materials were again below the corresponding month of last year. Month's exports are placed at 146,636 long tons, valued at $1,682,356. Decline from last year was due to smaller exports of rock and superphosphate. Increases were reported in nitrogenous materials and potash. August shipments of synthetic nitrate were heavy. Export tonnage in the first 8 months was larger than in the same '37 period, but it was smaller than two years ago.

The marked decline in imports continued in August. Totalling 77,452 long tons, valued at $1,841,858, they were 30% less in tonnage and 40% less in value than in August of last year. Decline from '37 was due to a sharp drop in potash imports. For the first 8 months of the year imports of nitrogenous materials were moderately below '37, with the principal exception to the downward trend being ammonium sulfate. All kinds of potash salts have been imported in smaller quantities.

Rise in Superphosphate Production

Although August superphosphate production was 24% below last year it was somewhat larger than in July, with the increase slightly greater than the usual seasonal rise. July, however, had been unusually low. August output was, however, the largest for that month in several years with the exception, of course, of August, '37. Production by reporting acidulators for the first 8 months of the current year has been 22% below the January-August period of '37. Last year production in southern plants was well above northern production, whereas this year it has been considerably less. End-of-the-month stocks were only 4% greater than on August 31, '37, and suggests in part a better balance between production and shipments in recent months.

Sulfuric Production Up Slightly

August sulfuric output by fertilizer manufacturers totaled 131,106 tons, as compared with 109,968 tons in July and 179,008 in August of last year. For the first 8 months production reached 1,134,339 as against 1,406,403 in the same period of '37. August consumption amounted to 128,312 tons, as compared with 92,189 tons in July and 168,015 in August of '37. The 8 months total for '38 was but 954,413 tons, a decided drop from the 1,276,237 tons consumed in the corresponding period of '37. Stocks on Aug. 31 were reported 85,787 tons, a slight drop from the July figure of 88,932 tons, but quite a gain as compared with the 67,167 tons in stock on Aug. 31, '37.

Prepared Monthly by the U. S. Industrial Chemical Co., Inc.

SOLVENT NEWS

Reg. U. S. Pat. Off.

November ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1938

Expect New Textile Printing Process To Open Wide Markets

Clear, Sharp Prints Obtained Easily by Fast *Aridye* Method

Further extensions of the *Aridye* textile printing process may lead to greatly increased use of prints, not only on cotton and rayons, but on woolens, worsteds, and the variety of fabrics composed in whole or part of rayon staple or other synthetics, executives of the Aridye Corporation said recently.

The *Aridye* process makes use of insoluble pigments of fine particle size uniformly dispersed in a vehicle in the form of a thin paste in which are incorporated certain water-insoluble binders.

Because of its wide divergence from established methods of printing, and because of the new and unusual color effects which have been obtained, the process has excited much comment in textile circles. It was first introduced about a year ago.

Fast to Light

Aridye prints are said to equal the best vat prints in being exceptionally fast to light and washing.

The compounds are applied on ordinary roller printing machines. Standard engravings are used but good results may also be obtained with relatively shallow engravings. Goods being run are dried and then cured by momentarily subjecting them to an elevated temperature to fix the colors and remove the solvent which is reported part of the compounds. Further after-treatment such as steaming, ageing or washing, is not necessary, it is said.

Mechanical Anchorage

In this brief treatment and simplification of the color preparation, textile men see many of the more important advantages of the process. *Aridye* prints in the final colors—anchorage to fibers is mechanical rather than chemical—and the time for taking patches is reduced, they point out. Streaks or imperfections are immediately visible to the printer, while elimination of ageing automatically prevents shading and tailing off.

Printers are said to be particularly impressed by the exceptionally clear prints and

(*Continued on next page*)

Says Moths Steer Clear Of Dimethylthianthrene

WASHINGTON, D. C.—Furs, feathers or wool immersed in a solution consisting of 20 parts of dimethylthianthrene dissolved in 980 parts of alcohol will be immune from damage by moths, it is claimed in a new U. S. patent.

Other compounds of the thianthrene series which may also be used include thianthrene, dichlorodimethylthianthrene, thianthrene-S-oxide, the patentees state.

"Azeotropic" Principle In Paint For Wet Metal

LONDON, England—An oil paint which "absorbs" water from any damp or wet metallic surface and which dries satisfactorily even in atmospheres continuously saturated with water vapor is described in a patent here.

One or more of the ingredients of the paint may be immiscible with water, the inventor explains, provided that two or more of the constituents of the whole mixture are capable of forming with water at least a ternary azeotropic mixture, i.e., a mixture of three liquids which has a lower boiling point than that of any of its individual ingredients.

Boils at 64.9°C

Cited in the patent as an example of a ternary azeotropic mixture to be used in such a paint is one containing 22.8 mol. per cent ethyl alcohol + 53.9 mol. per cent benzene + 23.3 mol. per cent water—the whole boiling at 64.9°C. When applied to a wet metal surface, the paint appears to absorb water, following which the azeotropic mixture of diluents and water forms and evaporates as a whole while the non-volatile part of the paint dries normally and without loss of adhesion to the "dewatered" surface.

The proper proportions of ethyl alcohol and benzene may be added to a paint consisting of linseed oil or tung oil or both in combination with selected resins and the desired pigments. The paint may contain, in addition, turpentine, solvent naptha, or mixtures of these, the inventor claims.

UNIFORM COLORATION on all fibers and fiber mixtures (including fibrous glass) is claimed for the new Aridye method of textile printing which bears great similarity to letter-press paper printing. Below are sample cotton shirtings. (*Aridye Corp.*)

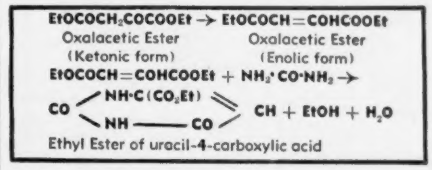
Reactions of Sodium Ethyl Oxalacetate Point to New Uses

Suggested Lines of Endeavor For U.S.I. Product Are Listed

Forecasts of several years ago that an unusual alcohol-derived chemical manufactured by U.S.I. would come into substantial use as chemists investigated its characteristics and working properties, are being fulfilled.

The chemical, Sodium Ethyl Oxalacetate, which has its principal use in the production of Tartrazine and other Pyrazolon dyestuffs has entered into a number of new fields. A measure of its greater employment is its price which currently is approximately 30% less than five years ago.

However, many chemists believe that the full possibilities of Sodium Ethyl Oxalacetate



OXALACETIC ESTER, easily prepared from Sodium Ethyl Oxalacetate by adding HCl, condenses with urea, both amino groups taking part in the reaction. The resultant product, uracil-4-carboxylic acid, melts at 347°C. and is extremely stable to sulphuric and nitric acids.

are yet to be explored. A citation of some typical reactions listed in the U.S.I. catalog, *Solvents and Chemicals*, shows a few suggested lines of endeavour:

(1) Manufacture of Tartrazine dyes.
(2) This ester adds on to ammonia and to many primary and secondary amines. The resultant products soon go over into the amines of oxalocitric acid lactone ester.
(3) If aldehydes are present when certain amines are condensed with oxalacetic ester, keto-pyrollidon carboxyllic acids are formed.
(4) In the presence of pyridine, ethyl oxal-

(*Continued on next page*)

Vitamin A Relieves Eyes, Improves Color Matching

MANSFIELD, Ohio—How Vitamin A can improve color matching efficiency, relieve eye fatigue and improve the general health of certain types of industrial workers is revealed by two eye specialists here.

Observations on a group of inspectors matching colors on a production line convinced the experimenters that the men were not regenerating their "visual purple" fast enough. (Visual purple is a substance in the retina of the eye closely connected with the process of seeing, particularly colors.) Knowing that the body's process of producing visual purple requires the presence of Vitamin A, the doctors prescribed three 10,000-unit capsules of carotene-in-oil daily.

At the end of seven months the specialists reported an increase in the regeneration of visual purple from 50 to 100%; more than 75% improvement in color matching efficiency, and an appreciable improvement in health, particularly where fatigue, headache and eyestrain formerly were chronic.

November ★ SOLVENT NEWS ★ 1938

SOLVENT NEWS

Inventors Claim New Paint Takes Polish After Drying Dull

MILWAUKEE, Wisc.—Two inventors here claim they have produced a paint which may be polished from a flat surface to a semi-gloss by rubbing or brushing, after the paint has dried to a point at which it has lost its sheen.

The polishing process, they say, can be used to produce designs on the painted surface. After thoroughly hardening, the paint can be washed or scrubbed without further polishing or without removing the design, the patent states.

A paint prepared according to their invention contains as an essential component a wax of the class of animal or vegetable waxes. In a typical formula cited, the following proportions by weight are used:

	Per Cent
Lithopone	61.5
Aluminum silicate	8.8
Beeswax	0.4
Flatting varnish	20.1
Linseed oil (cooked)	9.2
	100.0

The maximum quantity of wax which can be employed without impairing drying or other properties is one half of one per cent, the inventors state. Below this, however, it improves the washability, they hold.

New Markets For Sodium Ethyl Oxalacetate Seen

(*Continued from previous page*)

acetate and ethyl cyanacetate form triethyl cyanaconitate.

(5) With hydrochloric acid, oxalacetic ester is converted into derivatives of alpha pyrone.

(6) Oxalacetic ester is unstable, and on heating to 150°C. for four hours oxalocitric acid lactone is formed. Dilute potassium carbonate precipitates the stable potassium salt of oxalacetic ester.

(7) Oxalacetic acid is reduced by yeast to malic acid (Chem. Abs. 25. 4898).

(8) In the presence of pyridine or diethyl amine, 2 molecules of oxalacetic ester condense with one molecule of an acyclic aldehyde.

(9) Acetic anhydride and oxalacetic ester form acetoxyfumaric acid diethyl ester.

(10) Heated to 150-350°C., oxalacetic ester loses carbon monoxide and form diethyl malonate. (British Patent 228,863.)

Unlike the ethyl ester from which it is prepared, Sodium Ethyl Oxalacetate is quite stable and entirely suitable for uses where the ester might be employed.

Says Paint Sprayed Hot Will Resist Corrosion

LONDON, England — Hot spray-painting with a new type of gun has certain characteristics which are particularly advantageous on metals exposed to moisture, according to a report published here. No primer of lead is required and the method results in a dense, enamel-like coating which resists corrosion, the author asserts.

Paint, consisting of resin, wax, white zinc and graphite is liquified in an electrically heated reservoir and carried by compressed air to an ordinary paint spray cap in the nozzle of the gun. Flame from a compressed gas burner which surrounds this nozzle is said to warm and dry the surface while the paint is being applied.

Textiles Printed Like Paper In New Process

(*Continued from previous page*)

sharpness of fine lines on shirtings which are said to be possible with *Aridye* printing.

Although progress with the *Aridyes* during the past year has been swift, informed textile quarters believe the full impact of the process has not yet been felt. In support of this assertion, may be quoted a leading authority, *The Textile World*, which has this comment to make:

"There is a natural tendency to look at the *Aridyes* and the vat colors as being competitive, since they are more or less comparable from the standpoint of fastness properties and coats; but the extent to which the new process will replace vat printing is problematical. It would not be surprising, in fact, if in the long run the *Aridye* colors find their widest use, not as substitutes for the older classes of dyes, but in entirely new applications. [They] may prove to be the most important development in textile printing since the introduction of vat and naphthol colors and their derivatives."

Liquid Metal Polish

A formula for a liquid metal polish developed in Germany is given as follows: Dissolve 8 parts of fatty acids in 15 parts of denatured alcohol, saponify with 4 parts of ammonia (sp. gr. 0.91), add 2 parts of fatty alcohol sulfates, dissolve in 58 parts of benzine and stir the solution with 50 parts of fine Neuburger chalk.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

An antiseptic 91,000 times as bactericidal as carbolic acid and 1,300 times as potent as bichloride of mercury when tested against a variety of spore forming and non-spore forming organisms, has been introduced. It is odorless and colorless, an announcement continues, and is sufficiently non-irritating for use in cosmetics. **(No. 151)**

U S I.

A process to give "wet-strength" to paper, enabling it to resist the disintegrating effect of water, has successfully been applied to paper towels, according to a recent announcement. The relatively inexpensive process is said to keep the towels from tearing and "pulping" in use. **(No. 152)**

U S I.

A cedar-wood oil concentrate said to be particularly adaptable to termite-proofing formulas, is now available. It can be mixed with kerosene and paradichlorobenzene and will provide a weatherproof, protective film against rot and mold, the manufacturer claims. **(No. 153)**

U S I.

A new plastic coating applied to metal, glass, wood, and molded products by dipping or spraying is claimed to be superior to plating in acid resistance, salt spray, abrasion, and aging tests. According to the manufacturer, coatings from 0.003 in. to 0.10 in. thick may be applied in a variety of colors and textures. It is said to air-dry quickly to a smooth, lustrous surface. **(No. 154)**

U S I.

New diffusion pumps capable of producing vacuums of one/ten millionth m.m. at speeds of approximately 1,000 liters of gas per second, were announced recently. Employing a beam of special oil vapor in place of a rotary propellor, the pumps are reasonably priced, the manufacturer reports. **(No. 155)**

U S I.

For finishing creosote-treated wood surfaces, a new paint is said to form an effective seal against pitch and creosote. The hard, bright finish resists abrasion and is impervious to oils and dilute acids, according to the manufacturer. **(No. 156)**

U S I.

A new lacquer for spray application is said to air-dry to a decorative crystal design variable by adjustment of the spray gun. It is suitable, according to the manufacturer, for application on metallic and non-metallic surfaces, both porous and smooth. **(No. 157)**

U S I.

A white emulsion furniture polish now available for bottling under private label, gives a dry, non-greasy finish without hard rubbing, according to a recent announcement. The manufacturers state that the product does not separate after standing and is suitable for painted, varnished or lacquered woodwork. **(No. 158)**

Pigments and Fillers

Carbon Black Advanced 3/4¢ For '39

Trade Awaiting Price Announcements on Other Important Raw Paint Items—October Volume Satisfactory—Casein Goes Lower—Varnish Gums Advance—Heavy Demands in Coatings From the Automotive Industry—

Important Price Changes

ADVANCED		
	Oct. 31	Sept. 30
Carbon black	$0.03	$0.02¼
Zinc metal, E. St. L.	5.05	5.00
DECLINED		
Casein 20-20	$0.08	$0.08¾
80-100	.09	.09¼

Carbon Black Research

Continental Carbon's research division has just completed a very interesting and enlightening study on the factors controlling the rate of flow of dustless black through the Banbury charging apparatus. Information gained during this study demonstrated that the factors of density and percentage of fines must be taken into account in order to control the rate of flow desired through a given piece of charging apparatus. Details of the study are available to those interested by writing the company at 295 Madison ave., N.Y. City.

News of the Dyeing Plants

After threatening to close down the Williamsport, Pa., plant, Louis Auger, Sr., president of National Silk Dyeing, announced on Oct. 12 at the company's headquarters in Paterson, N.J., that operations would be resumed . . . DeGise Silk Dyeing will reopen its plant in Paterson.

Paramet Appoints Flynn

Paramet Chemical Corp. reports appointment of C. Homer Flynn as its sales manager. In his capacity as sales manager, Mr. Flynn's efforts will be directed towards effecting closer cooperation between Paramet Chemical and its sales representatives on the one hand, and its customers on the other.

Mr. Flynn's background and experience render him exceptionally well qualified for his new position. Coming from a family actively engaged in varnish making for three generations, Mr. Flynn himself began as a varnish maker's helper with one of the large eastern manufacturers, and rose to be factory superintendent. Prior to his association with Paramet, Mr. Flynn was, for 4 years, director of the Industrial Division of the National Paint, Varnish & Lacquer Manufacturers Association, and his fine record of service has made him well known in the industry.

The appointment of Mr. Flynn as its sales manager is in line with Paramet's recently announced policy of establishing more direct contact with the users of its resins.

The sales volume of raw coatings materials last month was fairly large, the stimulation coming from the fact that building activity was at a relatively high level, and the weather continued extremely favorable, while the automotive industry was operating quite close to maximum capacity in an effort to stock dealers for the opening of the '39 year. The main interest of the coatings industry, of course, centered in the Atlantic City meeting of the National Paint, Varnish & Lacquer Association.

October tonnages of raw materials were the largest for any month since early spring. Considerable spot purchasing was in evidence, indicating that while buyers were not disposed to place heavy commitments, they were being forced by the low state of inventories to replenish on a wide variety of items.

Carbon Black Price Revised

The opening gun in the contract season was fired in the first week of November when one important carbon black producer announced an upward revision. The jump amounted to ¾c a lb. The new level is established at 3c a lb., f.o.b. plant and at 4½c in carlot quantities at N. Y. The advance becomes effective as of the first of the year. This move was not entirely unexpected by the trade. The bitter and prolonged price war waged 12 months ago brought quotations down to the highly unprofitable level of 2¼c in February of '38. It did not seem likely that the producers would be willing to carry on on this basis indefinitely. With consumption mounting rapidly the fear of unwieldy surpluses is not as strong as it was a few months back.

Further weakness developed in casein and in the first week of November quotations sank to 8c for 20-30 mesh material and 9c for 80-100 mesh. Stocks in the hands of domestic producers are large, large supplies of Argentine material are readily available, and buyers are not showing much more than passing interest. This is specially true of buyers in the paper field. In past years the Argentine sold a sizeable proportion of its production to Germany, but sales to that country have dwindled perceptively since the "Ersatz" movement became a major economic policy of the Reich.

Aside from the announcement on carbon black no news has been forthcoming on contract prices for the important pigments. Lead prices are very firm and under present conditions the threat of higher price levels for red lead, litharge, orange-mineral, and white lead is a real one. The situation on the zinc pigments is practically the same.

One important item of news last month was the further strengthening of the price structure of many of the important types and grades of varnish gums. Cables from primary sources show a much firmer attitude on quotations.

October Sales Peak for Fall Season

October sales of raw materials probably were the peak for the fall season and November business is likely to show a recession. However, considerable stimulus will come from the increased demands of the automotive industry. Car manufacturers in the Detroit area are currently talking 800,000 to 1,000,000 units in the final quarter of '38. Further, should the contract prices generally for next year be higher than current levels, there naturally would be considerable artificial purchasing with buyers attempting to build up inventories against such rises.

Finished Products Sales Still Lag

August paint, varnish, lacquer, and fillers sales by 680 establishments, as reported by the Bureau of the Census, totaled $30,182,013, as compared with $27,946,084 in July and $35,305,043 in August of '37. Total for the first 8 months amounted to $239,093,812, as against $306,368,212 in the same period a year ago. Trade sales of paint, varnish, and lacquer by 580 establishments in August reached $17,224,845, as compared with $16,368,159 in July and $18,521,006 in August of '37. Total industrial sales reached $9,894,867, as compared with $8,806,128 in July and $13,517,878 in August of '37. Lacquer industrial sales jumped slightly in August over July, the figures being $3,014,873 and $2,421,508, respectively, but were well below the total of $4,286,992 for August of the previous year. Just how serious the decline in lacquer sales has been can be seen from a comparison of the figures for the first 8 months of '38 and '37—$22,041,979 and $33,846,662, respectively.

August plastic paint sales reached 556,684 lbs., as compared with 558,129 lbs. in July and 632,364 in August of '37. August calcimine sales were reported at 5,731,130 lbs., as compared with 4,924,302 in July and 5,071,758 lbs. in August a year ago. The totals for the respective 8 months periods were 50,279,540 lbs. and 58,656,135 lbs.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1937 Average $1.10 - Jan. 1938 $1.20 - Oct 1938 $1.23

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Acetaldehyde, drs, c-l, wks lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks ....lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs ..lb.	.39	.43	.32	.43	.32	.43
Acetanalid, tech, 150 lb bbls lb.	...	.29	.29	.32	.24	.29
Acetic Anhydride, drs, **f.o.b. wks, frt all'd** .....lb.	.10½	.11	.10½	.11	.13	.15
Acetin, tech, drs ....lb.	...	.33	...	.33	.22	.33
Acetone, tks, f.o.b. wks, frt all'd ....lb.	...	.04¾	...	.04¾	.04¾	.06½
drs, c-l, f.o.b. wks, frt all'd lb.	...	.05¾	...	.05¾	.05¾	.07½
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls ....lb.	.08¾	.09	.08¾	.10	.06¾	.10
Acetic, 28%, 400 lb bbls, c-l, wks ....100 lbs.	...	2.23	...	2.23	2.23	2.53
glacial, bbls, c-l, wks 100 lbs.	...	7.62	...	7.62	7.62	8.70
glacial, USP, bbls, c-l, wks ....100 lbs.	...	10.25	...	10.25	10.50	12.43
Acetylsalicylic, USP, 225 lb bbls ....lb.	..	.50	.50	.60	.50	.60
Adipic, kgs, bbls ....lb.	...	.72		.72	...	.72
Anthranilic, ref'd, bbls ...lb.	1.15	1.20	1.15	1.20	.85	1.00
tech, bbls ....lb.	...	.75	...	.75	...	.75
Ascorbic, bot. ....oz.	3.00	3.25	...	...	...	...
Battery, cbys, wks ...100 lbs.	1.60	2.55	1.60	2.55	1.35	2.60
Benzoic, tech, 100 lb kgs ..lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs ....lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ....ton *a*	...	96.00	95.00	96.00	...	95.00
Broenner's, bbls ....lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks ..lb.	...	.22	...	.22	...	.22
wks, lcl ....lb.	...	.23	...	.23	...	.23
tks, wks ....lb.	...	.21	...	.21	...	.21
Camphoric, drs ....lb.	5.50	5.70	5.50	5.70	5.50	5.70
Caproic, normal, drs. ....lb.	...	.35	...	...	...	...
Chicago, bbls ....lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks ....lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.15¼	.17¼	.15¼	.17¼	.15¼	.16¼
Citric, USP, crys, 230 lb bbls ....lb. *b*	.22	.23½	.22	.25	.24	.26
anhyd, gran, bbls .....lb. *b*	...	.25½	.25½	.26½	.26½	.29
Cleve's, 250 lb bbls ....lb.	...	.57	.50	.57	.50	.52
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.73	.74	.73	.91	.72	.91
99%, straw, LB, drs, wks, frt equal ....gal.	.78	.86	.78	.94	.77	.94
resin grade, drs, wks, frt equal ....lb.	.09¼	.09¾	.09¼	.11¼	.09	.11¼
Crotonic, bbls, delv ......lb.	.21	.50	.21	1.00	.75	1.00
Formic, tech, 140 lb drs ..lb.	.10½	.11½	.10½	.11½	.10½	.13
Fumaric, bbls ....lb.	...	.75	.60	.75	...	.60
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls ....lb.	.70	.73	.70	.79	.65	.75
USP, bbls ....lb.	.77	.81	.77	.91	.77	.91
Gamma, 225 lb bbls, wks ..lb.	...	.85	...	.85	...	.85
H, 225 lb bbls, wks ....lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 47% bottles ....lb.	...	2.30	2.20	2.30	...	...
Hydrobromic, 34% conct 155 lb cbys, wks ....lb.	.42	.44	.42	.44	.40	.42
Hydrochloric, see muriatic						
Hydrocyanic, cyl, wks ....lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks ....lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks ....lb.	.09	.09½	.09	.15	.10½	.15
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
22%, light ref'd, bbls ...lb.	.03½	.03¾	.03½	.03¾	.03½	.03¾
44%, light, 500 lb bbls ..lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
44%, dark, 500 lb bbls ..lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
50%, water white, 500 lb bbls ....lb.	.10½	.11½	.10½	.11½	.10½	.11½
USP X, 85%, cbys .....lb.	.42	.45	.42	.45	.42	.50
Lauric, drs. ....lb.	11¾	.12¼	.08½	.12¼	...	...
Laurent's, 250 lb bbls .....lb.	.45	.46	.45	.46	.45	.46
Levulinic, 5 lb bot, wks...lb.	...	2.00	...	2.00	...	...
Linoleic, bbls ....lb.	...	.20	...	.20	.16	.20
Maleic, powd, kgs ....lb.	.30	.40	.30	.40	.29	.40
Malic, powd, kgs ....lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls ....lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks ......N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.; *y* Price given is per gal.

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls ....lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks ....100 lb.	...	1.50	...	1.50	1.35	1.50
tks, wks ....100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks ..100 lb.	...	1.75	...	1.75	1.45	1.75
tks, wks ....100 lb.	...	1.10	...	1.10		1.10
22°, c-l, cbys, wks ..100 lb.	...	2.25	...	2.25	1.95	2.25
tks, wks ....100 lb	...	1.60	...	1.60	.	1.60
CP, cbys ....lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls ....lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	.13	.10	.13	.10	.14
Sludges, drs ....lb.	...	.05	...	.05	.05	.10
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks ....100 lb. *c*	...	5.00	...	5.00	..	5.00
38°, c-l, cbys, wks ..100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks ..100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks ..100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv ....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N Y ....lb.	.10¾	.12	.10¾	.12	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	.12	.14	.12	.14	.12	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks ..lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks ....lb.	.35	.40	.35	.40	.35	.40
Propionic, 98% wks, drs ..lb.	...	.22	...	.22	.20	.22
80% ....lb.	.16	.17½	.16	.17½	.16	.17½
Pyrogallic, tech, lump, pwd, bbls ....lb.	.	1.05	...	1.05	...	.
cryst, USP ....lb.	1.45	1.63	1.45	1.63	1.30	1.48
Ricinoleic, bbls ....lb.	...	.35	.35	.38	.35	.38
tech, bbls ....lb.	...	.13	...	.13	...	...
Salicylic, tech, 125 lb bbls, wks ....lb.	.	.33	.	.33	...	.33
USP, bbls ....lb.	.35	.40	.35	.45	...	...
Sebacic, tech, drs, wks ....lb.	...	nom.	.37	.41	.37	.41
Succinic, bbls ....lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.18
Sulfuric, 60°, tks, wks ....ton	...	13.00	...	13.00	12.00	13.00
c-l, cbys, wks ....100 lb.	...	1.25	...	1.25	1.10	1.25
66°, tks, wks ....ton	...	16.50	...	16.50	15.50	16.50
c-l, cbys, wks ....100 lb.	...	1.50	...	1.50	1.35	1.50
CP, cbys, wks ....lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ....ton	...	18.50	..	18.50	...	18.50
Tannic, tech, 300 lb bbls ..lb.	.40	.47	.40	.47	.19	.47
Tartaric, USP, gran, powd, 300 lb bbls ....lb.	.27¼	.27¾	.24¼	.27¾	.21¾	.25¼
Tobias, 250 lb bbls ....lb.	.65	.67	.65	.67	.65	.67
Trichloroacetic bottles ....lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs ....lb.	...	1.75		1.75	...	1.75
Tungstic, tech, bbls ....lb.	1.65	1.75	1.65	2.00	...	...
Vanadic, drs, wks ....lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls ....lb.	.52	.60	.52	.60	.47	.60
dark, bbls ....lb.	.13	.18	.11	.18	.11	.17
egg, edible ....lb.	.78	.80	.78	1.15	.76	1.15
vegetable, edible ....lb.	.74	.78	.74	.78	.76	.78
Alcohol, Amyl (from Pentane) tks, delv ....lb.	...	.106	.106	.123	...	.123
c-l, drs, delv ....lb.	...	.116	.116	.133	...	.133
lcl, drs, delv ....lb.	...	.126	.126	.143	...	.143
Amyl, secondary, tks, delv lb.	...	.08½	...	.08½	...	.08½
drs, c-l, delv E. of Rockies ....lb.	.	.09½	...	.09½	...	.
Benzyl, cans ....lb.	.68	1.00	.68	1.00	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt all'd ......lb. *d*	...	.08½	.08½	.09	.08½	.09
c-l, drs, f.o.b. wks, frt all'd ....lb. *d*	...	.09½	.09½	.10	.09½	.10
Butyl, secondary, tks, delv ....lb. *d*	...	.06	...	.06	.06	.07
c-l, drs, delv ......lb. *d*	...	.07	...	.07	.07	.08
Capryl, drs, tech, wks ..lb.	...	.85	...	.85		.85
Cinnamic, bottles ......lb.	2.00	2.50	2.00	2.50	2.00	3.65
Denatured, CD, 14, 13, c-l, drs. wks. ....gal. *e*	...	.34	.31	.35	.33	.35
tks, East, wks .....gal.	...	.26	.23	.29	...	...
Western schedule, c-l, drs, wks ....gal. *e*	...	.36	.36	.38	.37	.39
Denatured, SD, No. 1, tks ..	..	.24	.23	.27	.26	.27
c-l, drs, wks ......gal. *e*	..	.30	.29	.33	.32	.33

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices—Current

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Alcohols (continued):					
Diacetone, pure, c-l, drs, delv ... lb. f	...	.11½	...	.11½	...	.11½
tech, contract, drs, c-l, delv ... lb.	...	.10½	...	.10½	...	...
Ethyl, 190 proof, molasses, tks ... gal. g	...	4.50½	4.04	4.51½	4.05	4.07
c-l. drs ... gal. g	..	4.56½	4.10	4.59½	4.11	4.12
c-l, bbls ... gal. g		4.57½	4.11	4.58½	4.12	4.13
absolute, drs., f.o.b. wks. g	4.88	4.95	4.40	4.93	4.54	6.08½
Furfuryl, tech, 500 lb drs lb.	.25	.35	.25	.35	.30	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	.11½	.12
c-l, drs, delv ... lb.	...	.13	...	.13	.12½	.13
Normal, drs, wks ... lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv ... lb.	...	.27	.	.27	...	.27
Isobutyl, ref'd, lcl, drs ... lb.	...	.09	.09	.10	...	.10
c-l, drs ... lb.	...	.08½	.08½	.09½	...	.09½
tks ... lb.	...	.07½	.07½	.08½	...	.08½
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd ... lb.	...	.36	...	.36	.39½	.45
Ref'd 98%, drs. f.o.b. wks, frt all'd ... gal.	...	.41	...	.41	...	...
Tech 91%, drs, above terms ... gal.	...	.33½	...	.33½	...	...
tks, same terms ... gal.	...	.28½	...	.28½	...	...
Tech 98%, drs, above terms ... gal.	...	.37½	...	.37½	...	...
tks, above terms ... gal.	...	.32½	...	.32½	...	.
Spec Solvent, tks, wks gal.	. .	.25	.24	.28	.27	.28
Aldehyde ammonia, 100 gal drs ... lb.	.80	.82	.80	.82	.80	.82
Aldehyde Bisulfite, bbls, delv ... lb.	...	.17	...	.17	...	...
Aldol, 95%, 55 and 110 gal drs, delv ... lb.	...	.20	...	.20	...	...
Alphanaphthol, crude, 300 lb bbls ... lb.	...	.52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls ... lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks ... 100 lb.	3.40	3.65	3.40	3.65	3.00	3.25
delv NY, Phila ... 100 lb.	...	3.40	...	3.40	3.15	3.40
Granular, c-l, bbls. wks ... 100 lb.	3.15	3.40	3.15	3.40	2.75	3.00
Powd, c-l, bbls, wks 100 lb.	.	3.55	...	3.55	3.15	3.40
Chrome, bbls ... 100 lb.	6.50	6.75	6.50	6.75	6.50	7.25
Potash, lump, c-l, bbls, wks ... 100 lb.	3.65	3.90	3.65	3.90	3.25	3.50
Granular, c-l, bbls, wks ... 100 lb.	3.40	3.65	3.40	3.65	3.00	3.25
Powd, c-l, bbls, wks 100 lb.	3.80	4.05	3.80	4.05	3.40	3.65
Soda, bbls, wks ... 100 lb.	...	3.25	...	3.25	...	3.25
Aluminum metal, c-l, NY 100 lb.	...	20.00	...	20.00	19.00	20.00
Acetate, 20%, bbls ... lb.	.07½	.09	.07½	.10	.09	.10
Basic powd, bbls, delv lb.	.40	.50	.40	.50	...	...
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks ... lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06¼	.06	.06¼	.06	.06¼
Solution, drs, wks ... lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv ... lb.	...	.13	...	.13	...	...
Hydrate, 96%, light, 90 lb bbls, delv ... lb.	.12	.13	.12	.13	.13	.15
heavy, bbls, wks ... lb.	.029	.03½	.029	.03½	.029	.03½
Oleate, drs ... lb.	.16¾	.18½	.16¾	.18½	.16¾	.18½
Palmitate, bbls ... lb.	...	.23	...	.23	.22	.23
Resinate, pp., bbls ... lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls ... lb.	.19	.21	.19	.21	.19	.21
Sulfate, com, c-l, bgs, wks ... 100 lb.	...	1.15	1.15	1.35	...	1.35
c-l, bbls, wks ... 100 lb.	...	1.35	1.35	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks ... 100 lb.	...	2.00	...	2.00	...	1.90
c-l, bbls, wks ... 100 lb.	...	2.20	...	2.20	...	2.05
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.16	.22	.16	.22	.16	.22
26°, 800 lb drs, delv ... lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH ... cont.	...	.05	...	.05	.04½	.05
tk wagon ... lb.	...	.02	...	.02	...	.02
Ammonium Acetate, kgs ... lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks ... 100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls ... lb.	.14½	.16½	.14½	.17	.16	.17
carbonate, tech, 500 lb bbls ... lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks ... 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks ... 100 lb.	5.50	6.25	5.50	6.25	5.00	6.25
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls ... lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls ... lb.	...	.23	...	.23	.	.
Linoleate, 80% anhyd, bbls ... lb.	...	.15	...	.15	.11	.15
Naphthenate, bbls ... lb.	...	.17	...	.17	...	.
Nitrate, tech, cks ... lb.	.038	.0405	.038	.0405	.03¾	.04
Oleate, drs ... lb.	...	.15	...	.15	.15	.10
Oxalate, neut, cryst, powd, bbls ... lb.	.19	.20	.19	.22½	.22½	.23
Perchlorate, kgs ... lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs ... lb.	.21	.24	.21	.24	.21	.24
Phosphate, dibasic tech, powd, 325 lb bbls ... lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls ... lb.	...	.15	...	.15	...	...
Stearate, anhyd, bbls ... lb.	...	.24	...	.24	...	...
Paste, bbls ... lb.	...	.07½	...	.07½	...	...

g Grain alcohol 20c a gal. **higher in each case.**

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Ammonium (continued).					
Sulfate, dom, f.o.b., bulk ton	...	27.50	26.50	28.50	26.00	28.00
Sulfocyanide, pure, kgs ... lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane)						
tks, delv ... lb	...	.10	.10	.11½	...	.11½
c-l, drs, delv ... lb.	...	.11	...	...	...	...
lcl. drs. delv ... lb.	...	.12	...	...	...	...
tech, drs, delv ... lb.	...	.10½	.11	.10½	.11½	.13½
Secondary, tks, delv ... lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv ... lb.	...	.09½	...	.09½	...	.09½
tks, delv ... lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks ... lb.	.07	.077	.07	.077	.07	.077
tks, wks ... lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks ... lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs ... lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs ... lb.	...	.26	...	.26	...	.26
Amylene, drs, wks ... lb.	.102	.11	.102	.11	.102	.11
tks, wks ... lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks ... lb.	.14½	.17½	.14½	.17½	.15	.17½
Annatto fine ... lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% ... lb.	...	.75	...	.75	...	.75
40% ... lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls ... lb.	...	.65	...	.65	.50	.65
Antimony **metal slabs, ton** lots ... lb.	...	.12¼	.10¾	.14	.13⅝	.17¼
Butter of, see Chloride.						
Chloride, soln cbys ... lb.	...	.17	...	.17	...	.17
Needle, powd, bbls ... lb.	.12½	.14	.12½	.16	.14	.19½
Oxide, 500 lb bbls ... lb.	.11½	.12½	.11½	.16½	.14¼	.16½
Salt, 63% to 65%, tins ... lb.	.26	.27	.26	.27	.22	.24
Sulfuret, golden, bbls ... lb.	.22	.23	.22	.23	.22	.23
Archil, conc, 600 lb bbls ... lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls ... lb.	.18	.20	.18	.20	.18	.20
Aroclors, wks ... lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl ... lb.	.08½	.09	.08½	.09	.08½	.09¾
Arsenic, Metal ... lb.	.40	.41	.40	.44	.42	.44
Red, 224 lb cs kgs ... lb.	...	.15¾	..	.15¾	...	.15¾
White, 112 lb kgs ... lb.	.03	.03¾	.03	.04	.03	.04
Barium Carbonate precip, 200 lb bgs, wks ... ton	52.50	62.50	52.50	62.50	52.50	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ... ton	41.00	43.00	41.00	44.00	42.00	45.00
Chlorate, 112 lb kgs, NY lb.	.16½	.17½	.16½	.17½	.16½	.17½
Chloride, 600 lb bbls, delv, zone 1 ... ton	77.00	92.00	77.00	92.00	74.00	92.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls ... lb.	.04¾	.05½	.04¾	.05½	.04¾	.05½
Nitrate, bbls ... lb.	.06¾	.07¼	.06¾	.08¼	.07	.08¼
Barytes, floated, 350 lb bbls c-l, wks ... ton	...	23.65	...	23.65	...	23.65
Bauxite, bulk, mines ... ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ... ton	...	16.00	...	16.00	...	16.00
200 mesh ... ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb drs, wks ... lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, ft all'd ... gal.	...	.16	...	.16	...	.16
90% c-l, drs ... gal.	...	.21	...	.21	...	.21
Ind pure, tks, frt all'd gal.	...	.16	...	.16	...	.16
Benzidine Base, dry, 250 lb bbls ... lb.	.70	.72	.70	.72	.70	.72
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, 95-97% rfd, drs ... lb.	.30	.40	.30	.40	.30	.40
Tech, drs ... lb.	.25	.26	.25	.26	.25	.26
Beta-Naphthol, 250 lb bbl, wks ... lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls ... lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ... lb.	.51	.52	.51	.52	.51	.52
Bismuth metal ... lb.	1.05	1.15	1.00	1.10	1.00	1.10
Chloride, boxes ... lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes ... lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes ... lb.	.	2.95	...	2.95	2.75	3.04
Subbenzoate, boxes ... lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs ... lb.	1.53	1.56	1.13	1.58	1.23	1.58
Trioxide, powd, boxes ... lb.	...	3.57	.	3.57	3.45	3.57
Subnitrate, fibre, drs ... lb.	1.33	1.36	1.03	1.48	1.22	1.48
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ton h	40.00	75.00	40.00	75.00	40.00	75.00
Bleaching Powder, 800 lb drs, c-l, wks, contract ... 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks ... lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY ... unit	.	2.90	2.50	3.10	3.10	4.30
Chicago, high grade ... unit	..	2.85	2.35	3.35	3.00	4.65
Imported shipt ... unit	..	3.05	2.90	3.45	3.25	4.10
Blues, Bronze Chinese Milori Prussian Soluble ... lb.	.36	.37	.36	.37	.36	.37
Ultramarine,* dry, wks, bbls ... lb.	...	.11	...	.11	.10	.11
Regular grade, group 1 lb.	...	.16	...	.16	.15	.16
Special, group 1 ... lb.	...	.19	...	.19	.18	.19
Pulp, No. 1 ... lb.	...	.27	...	.27	.26	.27
Bone, 4½ + 50% raw, Chicago ... ton	28.00	29.00	25.50	30.00	26.00	30.00
Bone Ash, 100 lb kgs ... lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls ... lb.	.06½	.08¼	.06½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp. ... ton	...	23.00	20.50	23.75	23.75	27.75
Domestic, bgs, Chicago ton	23.00	24.00	16.00	24.00	19.00	27.00
Borax, tech, gran, 80 ton lots, sacks, delv ... ton i	...	43.00	42.00	43.00	40.00	42.00
bbls, delv ... ton i	...	53.00	52.00	53.00	50.00	52.00

h Lowest price is for pulp, **highest for high grade precipitated;** i **Crystals** $6 per ton higher; **USP, $15 higher in each case;** * **Freight is** equalized in each case with **nearest producing point.**

Prices—Current

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Borax (continued):						
Tech, powd, 80 ton lots,						
sacks ....ton i	...	47.00	...	47.00	45.00	47.00
bbls, delv ....ton i	...	57.00	...	57.00	56.00	57.00
Bordeaux Mixture, drs ...lb.	.11	.11½	.11	.11½	.10½	.11
Bromine, cases ....lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.90½	.92½	.90½	.92½	.80	1.50
Gold, blk ....lb.	.45	.65	.45	.65	.40	.65
Butanes, com 16-32° group 3						
tks ....lb.	.02¼	.03¾	.02¼	.03¾	.02¼	.03¾
Butyl, Acetate, norm drs, frt						
allowed ....lb.	.09½	.10	.09½	.10½	.10	.10½
tks, frt allowed ......lb.	...	.08½	.08½	.09	...	.09
Secondary, tks, frt allowed						
......................lb.	...	.06½	.06½	.07	.07	.07½
drs, frt, allowed .....lb.	.07½	.08	.07½	.08½	.08	.09
Aldehyde, 50 gal drs, wks						
......................lb.	.16½	.17½	.16½	.17½	.16½	.17½
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Crotonate, norm, 55 and						
110 gal drs, delv ....lb.	...	.36	...	.36	...	...
Lactate ....lb.	.22½	.23½	.22½	.23½	.22½	.23½
Oleate, drs, frt allowed..lb.	...	.25	...	.25	...	.25
Propionate, drs ....lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv ....lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs ....lb.	...	.26	...	.26	.25	.26
Tartrate, drs ....lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	.35½
Cadmium Metal ....lb.	...	.95	.95	1.60	1.05	1.60
Sulfide, orange, boxes ...lb.	.85	.95	.85	1.60	.90	1.60
Calcium, Acetate, 150 lb bgs						
c-l, delv ....100 lb.	...	1.65	...	1.65	1.65	2.25
Arsenate, c-l, E. of Rockies,						
dealers, drs ....lb.	.06¾	.07¼	.06¾	.07¼	.06¼	.07¾
Carbide, drs ....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs						
c-l ....lb.	...	1.00	...	1.00	...	1.00
Chloride, flake, 375 lb drs,						
burlap bgs, c-l, delv..ton	...	22.00	22.00	23.50	22.00	23.50
paper bgs, c-l, delv...ton	23.00	36.00	23.00	36.00	...	...
Solid, 650 lb drs, c-l,						
delv ....ton	...	20.00	20.00	21.50	20.00	21.50
Ferrocyanide, 350 lb bbls						
wks ....lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb						
bbls ....lb.	.50	.57	.50	.57	.50	.57
Levulinate, less than 25 bbl						
lots, wks ....lb.	...	3.00	...	3.00	...	...
Nitrate, 100 lb bgs .....ton	...	28.00	...	28.00	26.10	28.00
Palmitate, bbls ....lb.	.22	.23	.22	.23	.22	.23
Phosphate, tribasic, tech,						
450 lb bbls ....lb.	.06½	.07½	.06½	.07½	.06½	.07½
Resinate, precip, bbls ...lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ...lb.	.19	.21	.19	.21	.19	.21
Camphor, slabs ....lb.	.52	.52½	.52	.56	.54	.56
Powder ....lb.	.52	.52½	.52	.56	.54	.56
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, delv, price						
varying with zone† ...lb.	.027	.0380	.027	.0380	.0320	.0535
lcl, bgs, f.o.b. whse ..lb.	...	.05¾	...	.05¾	.06½	.07
cartons, f.o.b. whse..lb.	...	.06¼	...	.06¼	.07	.07¾
cases, f.o.b. whse ...lb.	...	.07	...	.07	.07¾	.08¼
Decolorizing, drs, c-l ...lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal						
drs, c-l, delv ....lb.	.05	.05½	.05	.06	.05¼	.06
Casein, Standard, Dom, grd lb.	.08½	.09	.06½	.13½	.11	.20¾
80-100 mesh, c-l, bgs ....lb.	.09	.09½	.07	.14	.11½	.21¼
Castor Pomace, 5½ NH_3, c-l,						
bgs, wks ....ton	...	18.50	18.50	21.00	21.00	25.00
Imported, ship, bgs ....ton	...	21.00	...	21.00	nom.	17.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs ....lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs						
......................lb.	...	.40	...	.40	.40	.55
Chalk, dropped, 175 lb bbls lb.	.02¾	.03¾	.02¾	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.02¾	.03¼	.02¼	.04	.03	.04
Light, 250 lb cks ....lb.	.03¼	.04	.03¼	.04	.03	.04
Charcoal, Hardwood, lump,						
blk, wks ....bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ....ton	23.00	34.00	23.00	34.00	23.00	34.40
Willow, powd, 100 lb bbl.						
wks ....lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified, tks, wks lb.	...	.01⅝	.01⅝	.02125	.01625	.02125
25%, bbls, wks ....lb.	...	.02	.02	.0225	.02	.0225
Pwd, 60%, 100 lb bgs,						
wks ....lb.	...	.04½	.04½	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	...	7.00	...	7.00	6.50	7.00
Imported, lump, blk ....ton	22.00	25.00	22.00	25.00	22.00	25.00
Chlorine, cyls, lcl, wks, con-						
tract ....lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract ...lb. j	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.	...	2.15	...	2.15	...	2.15
Multi, c-l, cyls, wks, cont						
......................lb.	2.30	2.55	2.30	2.55	2.30	2.55
Chloroacetophenone, tins, wks						
......................lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb						
drs, lcl, wks ....lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs						
......................lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins ....lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls ..lb.	...	.80	...	.80	...	.80
Chrome, Green, CP ....lb.	.21	.25	.21	.25	.20	.25
Yellow ....lb.	.14½	.15½	.14½	.15½	.13	.16½

j A delivered price; * Depends upon point of delivery; † New bulk price, tank cars ¼c per lb. less than bags in each zone.

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Chromium, Acetate, 8% Chrome, bbls ....lb.	.05	.08	.05	.08	.05	.08
Fluoride, powd, 400 lb bbl ....lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls ....bbl.	7.50	8.00	7.50	8.00	6.75	9.00
Cobalt Acetate, bbls ......lb.	.65	.67	.65	.68	.58	.68
Carbonate tech, bbls ....lb.	...	1.63	...	1.63	1.42¾	1.63
Hydrate, bbls ....lb.	...	1.78	1.36	1.78	...	...
Linoleate, solid, bbls ...lb.	...	.33	...	.33	.31	.33
paste, 6%, drs ....lb.	...	.31	...	.31	...	.31
Oxide, black, bgs ....lb.	...	1.67	...	1.67	1.41	1.67
Resinate, fused, bbls ....lb.	...	.13½	...	.13½	.13	.13½
Precipitated, bbls ....lb.	...	.34	.	.34	.30½	.34
Cochineal, gray or bk bgs..lb.	.35	.38	.35	.38	.32	.38
Teneriffe silver, bgs ....lb.	.36	.39	.36	.39	.33	.39
Copper, metal, electrol 100 lb.	...	11.25	9.00	11.25	11.00	16.25
Acetate, normal, bbls, wks ....lb.	.21	.23	.21	.23	...	...
Carbonate, 400 lb bbls ..lb.	.10½	.11½	.10¼	.11½	.10½	.12½
52-54% bbls ......lb.	.14½	.15½	.1340	.16¾	.15¾	.19
Chloride, 250 lb bbls ...lb.	.13	.14	.12½	.17	.15	.18
Cyanide, 100 lb drs .....lb.	...	.34	.34	.38	.37	.38
Oleate, precip, bbls ....lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks..lb.	.16¾	.17¾	.13½	.17¾	.17	.18
red 100 lb bbls ....lb.	.16¾	.17¾	.15	.19775	.17	.19975
Resinate, precip, bbls ...lb.	.15	.16	.15	.16	.15	.19
Stearate, precip, bbls ...lb.	.23	.24	.23	.24	.23	.40
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	..	4.50	4.00	4.50	4.25	4.50
Copperas, crys and sugar bulk c-l, wks ....ton		14.00	12.00	14.00	12.00	13.00
Corn Sugar, tanners, bbls 100 lb.	2.95	3.15	2.95	3.30	3.15	4.34
Corn Syrup, 42°, bbls..100 lb.	..	2.89	2.89	3.16	3.11	4.36
43°, bbls ....100 lb.	...	2.94	2.94	3.21	3.16	4.41
Cotton, Soluble, wet, 100 lb bbls ....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran, 300 lb bbls ....lb.	.22¾	.23¼	.19¾	.23¼	.15	.20¼
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks ......gal.	.13½	.14	.13½	.14	.13	.14
Grade 2 ....gal.	.122	.132	.122	.132	.113	.132
Cresol, USP, drs ....lb.	.10½	.11	.10½	.12½	.10	.13
Crotonaldehyde, 97%, 55 and 110 gal drs, delv .....lb.	...	.22	.22	.30	.26	.30
Cutch, Philippine, 100 lb bale lb.	.04¼	.04½	.04	.06	.04	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia ....unit	...	1.15	...	1.15	1.10	1.15
Derris root 5% rotenone, bbls ....lb.	.34	.38	.34	.43	.39	.47
Dextrin, corn, 140 lb bgs f.o.b., Chicago ....100 lb.	3.30	3.50	3.30	3.75	3.50	5.00
British Gum, bgs ...100 lb.	3.55	3.75	3.55	4.00	3.75	5.25
Potato, Yellow, 220 lb bgs lb.	.07¼	.08¾	.07¼	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl..lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ....lb.	...	.0715	.0715	.08	...	.08
White, 140 lb bgs ...100 lb.	3.30	3.50	3.30	3.70	4.00	4.58
Diamylamine, c-l, drs, wks lb.	.47	.75	.47	.75	.47	.75
Diamylene, drs, wks ......lb.	.095	.102	.095	.102	.095	.102
tks, wks ....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.085	.092
tks, wks ....lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks ...lb.	...	.30	.	.30	...	.30
Diamylphthalate, drs, wks lb.	.19	.19½	.19	.21	.19	.21½
Diamyl Sulfide, drs, wks ..lb.	...	1.10	..	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks ....lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.55	.	.55	...	.
Dibutyl Ether, drs, wks, lcl lb.	...	.25	.25	.30	...	.30
Dibutylphthalate, drs, wks, frt all'd ....lb.	.19	.19½	.19	.21	.19½	.21
Dibutyltartrate, 50 gal drs lb.	.45	.54	.45	.54	.35	.50
Dichlorethylene, drs ......lb.	...	.25	...	.25	.25	.29
Dichloroethylether, 50 gal drs, wks ....lb.	.15	.16	.15	.16	.15	.16
tks, wks ....lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	no prices		...	...	...	...
tks, wks ....lb.	no prices		...	...	...	...
Diethanolamine, tks, wks ..lb.	...	.23	...	.23	.23	.25
Diethylamine, 400 lb drs ..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs..lb.	.40	.52	.40	.50	.40	.50
Diethyl Carbinol, drs .....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs..lb.	.31¾	.35	.31¾	.35	.31¾	.35
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.19	.19½	.18	.19½
Diethylsulfate, tech, drs, wks, lcl ....lb.	.13	.14	.13	.14	.13	.20
Diethyleneglycol, drs .....lb.	.16	.17	.16	.17	.16	.23
Mono ethyl ethers, drs ..lb.	.15	.16	.15	.16	.15	.17
tks, wks ....lb.	...	.14	...	.14	.14	.15
Mono butyl ether, drs ..lb.	.23	.24	.23	.24	.23	.26
tks, wks ....lb.	...	.22	...	.22	...	...
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls .....lb.	...	.21	...	.21	.21	.24
Laurate, bbls ....lb.	...	.27½	...	.27½	...	...
Stearate, bbls ....lb.	...	.27½	...	.27½	...	...
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ....lb.	...	1.00	...	1.00	...	.95
Dimethylaniline, 340 lb drs lb.	.26	.27	.26	.27	.26	.27
Dimethyl Ethyl Carbinol, drs lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed ....lb.	...	.19	...	.19	.20½	.21
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb. *k*	.16	.19	.16	.19	.16	.19

k Higher price is for purified material.

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Dinitrochlorobenzene, 400 lb bbls ....lb.	.13½	.14	.13½	.14	.14	.17½
Dinitronaphthalene, 350 lb bbls ....lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls ..lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	...	.15½	...	.15½	.14½	.15½
Diphenyl, bbls ....lb.	.15	.25	.15	.25	.15	.25
Diphenylamine ....lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs ....lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	.	nom.	...	nom.	34.00	nom.
Extract ....lb.	.05¾	.06¾	.05	.06¾	.05	.05½
EGG YOLK						
Egg Yolk, dom., 200 lb cases lb.	.66	.68	.60	.68	.68	nom.
Imported ....lb.	...	nom.	.62	.68	.53	.65
Epsom Salt, tech, 300 lb bbls c-l, NY ....100 lb.	1.90	2.10	1.90	2.10	1.80	2.10
USP, c-l, bbls ....100 lb.	...	2.10	...	2.10	2.00	2.10
Ether, USP anaesthesia 55 lb drs ....lb.	.22	.23	.22	.23	.22	.23
(Conc) ....lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs ....lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed ....lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles ....lb.	...	.68	...	.68	.68	.77
Synthetic, wks, drs ....lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt all'd ....lb.	...	.05½	...	.05½	.05½	.06½
drs, frt all'd ....lb.	...	.06½	...	.06½	.06½	.07½
95%, tks, frt allowed ..lb.	...	.06¾	...	.06¾	...	.06¾
drs, frt all'd ....lb.	...	.07¾	...	.07¾	...	.07¾
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs ....lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd ....lb.	.45	.50	.45	1.00	...	...
Chloride, 200 lb drs ....lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys ....lb.	...	.30	...	.30	...	.30
Crotonate, drs ....lb.	1.00	1.25	1.00	1.25	1.00	1.25
Formate, drs, frt all'd ..lb.	.27	.28	.27	.28	.27	.31
Lactate, drs, wks ....lb.	...	.33	...	.33	...	.33
Oxalate, drs, wks ....lb.	.30	.34	.30	.34	.30	.34
Oxybutyrate, 50 gal drs, wks ....lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks ....lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs ....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont ....lb.	.75	.85	.75	.85	.75	.85
Anhydrous ....lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks ..lb.	.17	.21	.17	.21	.17	.21
tks, wks ....lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks ....lb.	.20	.21	.20	.21	.20	.21
tks, wks ....lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks ....lb.	.16	.17	.16	.17	.16	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks ....lb.	...	.14	...	.14	...	.14
tks, wks ....lb.	...	.13	...	.13	...	13
Mono, Methyl Ether, drs wks ....lb.	.18	.22	.18	.22	.18	.22
tks, wks ....lb.	...	.17	...	.17	...	.17
Oxide, cyl ....lb.	.50	.55	.50	.55	.50	.55
Ethylidenaniline ....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery ....ton	17.00	19.00	17.00	19.00	...	14.50
Powd, blk, wks ....ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls ....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks ....unit *l*	...	3.30	2.75	3.30	...	...
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis ....unit *m*	...	2.50	2.50	2.50	2.75	3.15
Fluorspar, 98%, bgs ....lb.	...	33.00	...	33.00	no prices	
Formaldehyde, USP, 400 lb bbls, wks ....lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.06¼
Fossil Flour ....lb.	.02½	.04	.02½	.04	.02¼	.04
Fullers Earth, blk, mines ..ton	10.00	11.00	10.00	11.00	6.50	15.00
Imp powd, c-l, bgs ....ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks ..lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs ....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.12½	.14	.12½	.14	.12½	.18
Fustic, crystals, 100 lb boxes ....lb.	.22	.26	.22	.26	.20	.26
Liquid 50°, 600 lb bbls ..lb.	.09½	.13	.09½	.13	.08½	.13
Solid, 50 lb boxes ....lb.	.17½	.19½	.17½	.19½	.16	.19½
G SALT PASTE						
G Salt paste, 360 lb bbls ...lb.	.45	.47	.45	.47	.45	.47
Gall Extract ....lb.	.19	.20	.19	.20	.19	.20
Gambier, com 200 lb bgs ..lb.	.06¾	.07¾	.06¾	.07¾	...	nom.
Singapore cubes, 150 lb bgs ....100 lb.	.08½	.09	.08½	.11	.09½	.10½
Gelatin, tech, 100 lb cs ...lb.	.45	.50	.45	.50	.45	.55
Glauber's Salt, tech, c-l, bgs, wks* ....100 lb.	.95	1.15	.95	1.15	.95	1.15
Anhydrous, see Sodium Sulfate.						

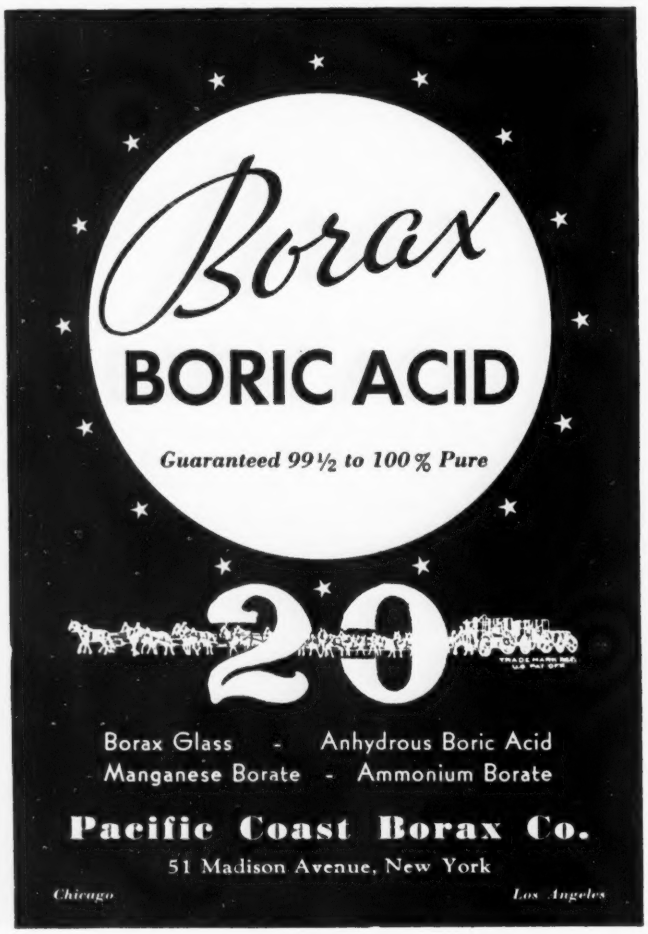
l + 10; *m* + 50; ***Bbls. are 20c higher.**

		Current Market		1938		1937	
				Low	High	Low	High
Glue, bone, com grades, c-l							
bgs	lb.	.13	.15½	.13	.16½	.11	.17½
Better grades, c-l, bgs	lb.	.14½	.16½	.14½	.16½	.12½	.17½
Glycerin, CP, 550 lb drs	lb.	...	.14¼	.14¼	.16	.15½	.29
Dynamite, 100 lb drs	lb.	.12¾	.13¼	.12¾	.16	.15½	.29
Saponification, drs	lb.	..	.08⅞	.08⅞	.11¼	.11	.29
Soap Lye, drs	lb.	.08	.08¾	.08	.10¼	.10	.27
Glyceryl Bori-Borate, bbls	lb.	...	.40	...	.40	...	...
Monoricinoleate, bbls	lb.	...	.27	...	.27	...	...
Monostearate, bbls	lb.	...	.30	...	.30	...	...
Oleate, bbls	lb.	...	.22	...	.22	...	...
Phthalate	lb.	...	.37	...	.37	.29	.37
Glyceryl Stearate, bbls	lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls	lb.	...	.26	...	.26	...	...
Phthalate, drs	lb.	...	.40	...	.40	.29	.40
Stearate, drs	lb.	...	.27½	...	.27½	.23	.27½

GUMS

		Current Market		1938 Low	1938 High	1937 Low	1937 High
Gum Aloes, Barbadoes	lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts	lb.	.09½	.09¾	.09¼	.12	.10½	.15½
White sorts, No. 1, bgs	lb.	.23	.24	.23	.28	.24	.30
No. 2, bgs	lb.	.21	.22	.21	.26	.22	.28
Powd, bbls	lb.	.12½	.12½	.12	.16	.14	.19
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b.,							
NY	lb.	02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b., NY, drs	ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases,							
f.o.b., NY	lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120							
lb cases	lb.	.23	.25	.15	.25	.15	.25
Copal, Congo, 112 lb bgs,							
clean, opaque	lb.	...	.18¾	.18¾	.19¼	.18⅞	.19¼
Dark amber	lb.	...	.07½	.07½	.08⅞	.06⅞	.09¼
Light amber	lb.	...	.11⅞	.11⅞	.13¼	.10¼	.14⅜
Copal, East India, 180 lb bgs							
Macassar pale bold	lb.	...	.12⅛	.12⅛	.13	...	.13
Chips	lb.	.	.05⅜	. .	.05⅜	.05⅜	.06½
Dust	lb.	.03¼	.04	.03½	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.09½	.09⅛	.10⅜	.10⅜	.11¼
Singapore, Bold	lb.	...	.14⅞	.14½	.15¼	.15¼	.15⅝
Chips	lb.	...	.06½	.04¾	.05⅜	.04¼	.05
Dust	lb.	.03¼	.04	.03¼	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10	...	.10	.10	.10¾
Copal Manilla, 180-190 lb							
baskets, Loba A	lb.	...	.11¼	.11¼	.12	.09¾	.12
Loba B	lb.	...	.10¼	.10¼	.11⅝	.09¼	.11⅝
Loba C	lb.	...	.09¾	.09¾	.11¼	.08⅞	.11¼
DBB	lb.	...	.08⅜	.08	.08¾	.08	.08¾
Dust	lb.	...	.05⅛	.05⅛	.06⅝	.05¾	.06⅝
MA sorts	lb.	...	.06⅛	.05⅞	.07¼	.06¾	.07¼
Copal Pontianak, 224 lb cases,							
bold genuine	lb.	...	.15¼	.15¼	.16½	.15½	.16½
Chips	lb.	...	.08⅝	.08⅝	.10¼	.09⅛	.11⅛
Mixed	lb.	...	.14	.	.14	.13½	.14
Nubs	lb.	...	.11¾	.11¾	.12⅞	.12¾	.13½
Split	lb.	...	.13⅞	...	.13⅞	.13½	.15¼
Dammar Batavia, 136 lb cases							
A	lb.	...	.20⅞	.20⅞	.25½	.23½	.25½
B	lb.	...	.19⅜	.19⅜	.24	.22⅛	.24
C	lb.	...	.15¾	.15¾	.20⅜	.18½	.20⅜
D	lb.	...	.13¾	.13¾	.17½	.15¼	.17½
A/D	lb.	...	.16⅛	.16⅛	.20⅜	.17⅝	.20⅜
A/E	lb.	...	.13½	.13½	.17¼	.14⅞	.17¼
E	lb.	...	.07⅜	.07⅜	.08½	.07½	.08½
F	lb.	...	.07¼	...	.07¼	.06¼	.07¼
Singapore, No. 1	lb.	...	.16	.15⅝	.21⅛	.17⅛	.21½
No. 2	lb.	...	.11⅛	.10⅜	.15⅜	.14⅛	.16¼
No. 3	lb.	...	.05¼	.05	.05¾	...	.05¾
Chips	lb.	...	.10⅝	.10⅝	.13½	.10¼	.13½
Dust	lb.	...	.05¼	.05	.05¾	.05¾	.06
Seeds	lb.	...	.07¾	.07¾	.09½	.07⅛	.09½
Elemi, cns., c.l.	lb.	...	.08⅛	.08⅛	.09½	.09⅜	.10¼
Ester	lb.	.06¼	.07	.06¼	.08½	.09	.12
Gamboge, pipe, cases	lb.	.60	.65	.60	.80	.58	.80
Powd, bbls	lb.	.65	.70	.65	.85	.65	.85
Ghatti, sol. bgs	lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls., bxs., drs.,	lb.	.14½	.23	...	...	...	...
Kauri, NY,							
Brown XXX, cases	lb.	.60	.60½	.60	.60½	.60	.60½
BX	lb.	...	.38	...	.38	.33	.38
B1	lb.	...	.28	...	.28	.21	.28
B2	lb.	...	.24	...	.24	.15½	.26
B3	lb.	...	.18½	...	.18½	.12	.18½
Pale XXX	lb.	...	.61	...	.61	.61	.65½
No. 1	lb.	...	.41	...	.41	.40	.41
No. 2	lb.	...	.24	...	.24	.22	.24
No. 3	lb.	...	.17¾	...	.17¾	.15	.17¾
Kino, tins	lb.	2.50	2.75	2.00	2.75	.70	2.10
Mastic	lb.	.55	.56	.55	.56	.55	.58
Sandarac, prime quality, 200							
lb bgs & 300 lb cks	lb.	.19	.20	.19	.26	.25	.35
Senegal, picked bags	lb.	.25	.27	.23	.27	.20	.29
Sorts	lb.	.09¼	.09½	.09¼	.12	.09¾	.15
Thus, bbls	280 lbs.	14.00	14.25	13.50	14.25	12.00	14.00
Strained	280 lbs.	14.00	14.25	...	14.25	12.00	14.00
Tragacanth, No. 1, cases	lb.	2.65	2.70	2.65	3.00	2.40	3.25
No. 2	lb.	2.35	2.40	2.35	2.75	2.00	2.75
No. 3	lb.	2.30	2.35	2.30	2.70	1.95	2.70
No. 4	lb.	2.25	2.30	2.25	2.65	1.85	2.65
No. 5	lb.	2.20	2.25	2.20	2.50	1.65	2.50
Yacca, bgs	lb.	.03½	.04½	.03½	.04½	.03¼	.04½
Helium, cyl (200 cu. ft.)	cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls	lb.	.18	.34	.18	.34	.16	.34
Hemlock, 25%, 600 lb bbls,							
wks	lb.	.03	.03¼	.03	.03¼	.03	.03¼
tks	lb.	...	.02⅝	.02⅝	.02¾	...	.02¾

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C.						
Group 3, tks ....gal.	...	.10½	...	.10½	...	.10½
Hexamethylenetetramine,						
powd, drs ....lb.	.35	.36	.35	.36	.35	.36
Hexyl Acetate, secondary,						
delv, drs ....lb.	.13	.13½	.13	.13½	.13	.13½
tks ....lb.	...	.12	...	.12	...	.12
Hoof Meal, f.o.b. Chicago unit	...	2.50	2.35	3.35	3.20	3.75
Hydrogen Peroxide, 100 vol,						
140 lb cbys ....lb.	.19½	.20	.19½	.20	.20	.21
Hydroxylamine Hydrochloride						
......................lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.16	.21	.16	.21	.15	.21
INDIGO						
Indigo, Bengal, bbls ......lb.	....	2.40	...	2.40	...	2.40
Synthetic, liquid ....lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars .lb.	...	1.75	1.50	1.75	1.50	1.60
Irish Moss, ord, bales ....lb.	.10	.11	.10	.11	.11	.12
Bleached, prime, bales ..lb.	.19	.20	.19	.20	.19	.21
Iron Acetate Liq. 17°, bbls,						
delv ....lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls ..100 lb.	2.32	3.11	2.32	3.11	2.32	3.25
Isobutyl Carbinol (128-132° C)						
drs, wks ....lb.	.33	.34	.33	.34	.33	.34
tks, wks ....lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt						
all'd ....lb.	...	.05½	...	.05½	.05½	.06½
drs, frt all'd ....lb.	.06½	.07	.06½	.07	.06½	.08
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l,						
Pacific Coast ....**ton**	22.00	85.00	22.00	85.00	22.00	85.00
LEAD ACETATE						
Lead Acetate, f.o.b. NY, bbls,						
White, broken ....lb.	...	.10	.10	.11	.11	.13½
cryst, bbls ....lb.	...	.10	.10	.11	.11	.13½
gran, bbls ....lb.	...	.10¾	.10¾	.11¾	.11¾	.14¼
powd, bbls ....lb.	...	.10¾	.10¾	.11¾	.11¾	.14¼
Arsenate, East, drs .....lb.	.11	.11½	.11	.13½	.11	.13½
Linoleate, solid, bbls ...lb.	...	.19	...	.19	.18	.19
Metal, c-l, NY .....100 lb.	...	5.10	4.00	5.10	4.75	7.05
Nitrate, 500 lb bbls, wks lb.	.10	.11½	.10	.11½	.09	.11½
Oleate, bbls ....lb.	.18½	.20	.18½	.20	.15	.20
Red, dry, 95% Pb_3O_4,						
delv ....lb.	...	.08	.06½	.08	.07¼	.0945
97% Pb_3O_4, delv .....lb.	.0785	.081	.06¾	.081	.07½	.09¾
98% Pb_3O_4, delv .....lb.	.081	.0835	.07	.0835	.07¾	.10
Resinate, precip, bbls ...lb.	...	.16½	...	.16½	.14	.16½
Stearate, bbls ....lb.	.22	.23	.22	.23	.22	.23
Titanate, bbls, c-l, f.o.b.						
wks, frt all'd ....lb.	.11	.11½	.11	.11½	.10	.12
White, 500 lb bbls, wks lb.	...	.06¾	.06	.06¾	.06¾	.09
Basic sulfate, 500 lb bbls,						
wks ....lb.	...	.06	.05¼	.06¼	.06¼	.08¾
Lime, chemical quicklime,						
f.o.b., wks, bulk .....ton	7.00	8.00	7.00	8.00	6.00	8.00
Hydrated, f.o.b., wks ..ton	8.50	12.00	8.50	12.00	8.00	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks..gal.	.08	.11½	.08	.11½	...	.11
drs ....gal.	.11	.16	.11	.16	.13	.16
Linseed Meal, bgs ....ton	...	41.00	39.00	45.00	35.00	42.50
Litharge, coml, delv, bbls..lb.	...	.066	.05½	.066	.06¼	.08½
Lithopone, dom, ordinary,						
delv, bgs.............lb.	...	.04⅛	.04⅛	.04⅝	.04¼	.04⅝
bbls ....lb.	...	.04⅜	.04⅜	.04⅞	.04½	.04⅞
High strength, bgs .....lb.	...	.05⅝	.05⅝	.06⅛	.05¾	.06⅛
bbls ....lb.	...	.05⅞	.05⅞	.06⅜	.06	.06⅜
Titanated, bgs ....lb.	...	.05⅝	.05⅝	.06⅛	.05¾	.06⅛
bbls ....lb.	...	.05⅞	.05⅞	.06⅜	.06	.06⅜
Logwood, 51°, 600 lb bbls..lb.	.09½	.11½	.09½	.11½	.08½	.11½
Solid, 50 lb boxes ......lb.	.15	.19	.15	.19	.15	.17½
Sticks ....ton	24.00	25.00	24.00	25.00	24.00	25.00
MADDER						
Madder, Dutch ....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, **tech, 70 lb**						
bgs, wks ....lb.	.05¾	.06½	.05¾	.07	.06	.07
Chloride flake, 375 lb drs,						
c-l, wks ....ton	39.00	42.00	39.00	42.00	39.00	42.00
Fluosilicate, crys, 400 lb						
bbls, wks ....lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, calc tech. heavy bbls,						
frt all'd ....**lb.**	.25	.30	.25½	.30½	...	...
Light, bbls, above **basis** lb.	.20	.25	.20	.25½	...	...
USP Heavy, bbls, above						
basis ....**lb.**	.25	.30	.25	.30½	...	...
Palmitate, bbls ....lb.	.33	nom.	...	.33	.33	nom.
Silicofluoride, bbls .....lb.	.09½	.10½	.09½	.10½	.09½	.10½
Stearate, bbls ....lb.	.21	.24	.21	.24	.21	.24
Manganese acetate, drs ...lb.	...	.26½	...	.26½	.25½	.26½
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks ....lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide),						
paper bgs, c-l ....ton	...	54.50	54.50	62.50	47.50	62.50
Hydrate, bbls ....lb.	...	.32	...	.32	...	.32
Linoleate, liq, drs ......lb.	.18	.19¼	.18	.19¼	.18	.19¼
solid, precip, bbls ....lb.	...	.19	...	.19	.17½	.19
Resinate, fused, bbls ....lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs ....**lb.**	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-						
95%, 550 lb drs .....lb.	.07	.07½	.07	.07½	.07	.07½



Prices

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Mangrove, 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African ... ton	...	24.00	24.50	24.00	25.00	27.00
Mannitol, pure cryst, cs, wks lb.	...	1.30	1.30	1.45	1.45	1.48
Marble Flour, blk ... ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercury chloride (Calomel) lb.	...	1.28	1.18	1.59	1.05	1.60
Mercury metal ... 76 lb. flasks	..	73.00	73.00	84.50	81.00	99.00
Meta-nitro-aniline ... lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ... lb.	1.45	1.55	1.45	1.55	1.45	1.55
Meta-phenylene diamine 300 lb bbls ... lb.	.80	.84	.80	.84	.60	.84
Meta-toluene-diamine, 300 lb bbls ... lb.	.65	.67	.65	.67	.65	.67
Methanol, denat, grd, drs, c-l, frt all'd ... gal.	...	.30	.30	.36	.36	.53
tks, frt all'd ... gal.	...	.25	.25	.30	.30	.48
Pure, drs, c-l, frt all'd gal.	...	.38	...	.38	..	.38
tks ... gal.	...	.33	...	.33	...	.33
95%, tks ... gal.	...	.31	...	.31	...	.31
97%, tks ... gal.	...	.32	...	.32	..	.32
Methyl Acetate, tech, tks, delv ... lb.	...	.06½	...	.06½	...	...
55 gal drs, delv ... lb.	.07½	.08	.07½	.08	...	...
C.P. 97-99%, tks, delv lb.	...	.07	...	.07	...	...
55 gal drs, delv ... lb.	.08	.08½	.08	.08½	...	..
Acetone, frt all'd, drs gal. *p*	.30	.36	.30	.40½	.34½	.58½
tks, frt all'd, drs ... gal. *p*	.25	.29	.25	.32½	.28½	.44½
Synthetic, frt all'd, east of Rocky M., drs ... gal. *p*	.38	.41	.38	.51	.42	.59½
tks, frt all'd ... gal.	...	.31½	.31½	.39½	.36	.49½
West of Rocky M., frt all'd, drs .. gal. *p*	...	.42	.42	.46	.46	.58
tks, frt all'd .. gal. *p*	...	.35	.35	.39½	.39½	.51
Anthraquinone ... lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks ... lb.	...	.10½	...	.10½	...	.10½
Chloride, 90 lb cyl ... lb.	.32	.40	.32	.40	.32	.43
Ethyl Ketone, tks, frt all'd lb.	...	.05½	.05½	.06	...	.07½
50 gal drs, frt all'd c-l .. lb.	...	.06½	.06½	.07	...	...
Formate, drs, frt all'd .. lb.	.35	.36	.35	.36	.35	.39
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd ... lb.	...	.30	...	.30	...	.30
Propyl carbinol, drs ... lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks ... lb.	...	30.00	30.00	35.00	...	35.00
Michler's Ketone, kgs ... lb.	...	2.50	...	2.50	...	2.50
Molasses, blacksrap, tks, f.o.b. NY ... gal.	...	.07	...	.07	.07	.07¼
Monoamylamine, c-l, drs, wks lb.	.52	1.00	.52	1.00	.52	1.00
Monobutylamine, lcl, drs, wks ... lb.	...	.65	...	.65	...	...
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	...	.23	...	.23	.25	.30
Monomethylamine, drs, frt all'd, E. Mississippi, c-l .. lb.	...	.65	...	.65	...	.65
Monomethylparaminosulfate, 100 lb drs ... lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls .. lb.	.03¾	.04¼	.03¾	.04¼	.	.04¼
50% Solid, 50 lb boxes .. lb.	.04⅜	.05	.04⅜	.06¼	.06	.06¼
J1 bgs ... ton	...	26.00	26.00	30.00	26.50	30.00
J2 bgs ... ton	...	18.00	18.00	22.00	19.00	22.50
R2 bgs ... ton	...	19.00	17.00	22.00	18.75	22.00
NAPHTHA						
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ... gal.	...	.26	.26	.31	...	.31
drs, c-l ... gal.	...	.31	.31	.36	...	.36
NAPHTHALENE						
Naphthalene, dom, crude, bgs, wks ... lb.	2.35	2.85	2.35	2.85	2.00	3.00
Imported, cif, bgs ... lb.	...	1.85	1.40	2.25	2.20	3.00
Balls, flakes, pks ... lb.	...	.06½	.06½	.08	...	.08
Balls, ref'd, bbls, wks .. lb.	...	.05¾	.05¾	.07¼	...	.07¼
Flakes, ref'd, bbls, wks .. lb.	..	.05¾	.05¾	.07¼	...	.07¼
Nickel Carbonate, bbls ... lb.	.36	.37½	.36	.37½	.36	.37½
Chloride, bbls ... lb.	.18	.20	.18	.20	.18	.20
Metal ingot ... lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY .. lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ... lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs ... lb.	...	.76	...	.76	...	.76
Nitre Cake, blk ... ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, redistilled, 1000 lb drs, wks ... lb.	.08	.10	.08	.10	.08	.10
tks ... lb.	...	.07½	...	.07½	...	.07½
Nitrocellulose, c-l, l-c-l, wks lb.	.22	.29	.22	.29	.26	.29
Nitrogen Sol. 45½% ammon., f.o.b. Atlantic & Gulf ports, tks, unit ton ...	...	1.03	1.01	1.03	...	...
Nitrogenous Mat'l, bgs, imp unit	. .	2.60	2.35	2.65	2.55	3.55
dom, Eastern wks ... unit	...	2.60	2.50	2.75	2.50	4.25
dom, Western wks ... unit	...	2.25	2.20	2.35	2.25	3.75
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ... lb.	no prices		...	...	.20	.22
Chinese, bgs ... lb.	no prices		...	...	.20	.22
OAK BARK						
Oak Bark Extract, 25%, bbls lb.	...	.03⅛	...	.03⅛	...	.03⅛
tks ... lb.	...	.02¾	.	.02¾	...	.02¾
Octyl Acetate, tks, wks ... lb.	.16	.17	.16	.17	.16	.17

a Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

Current

Orange-Mineral
Phenylhydrazine Hydrochloride

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Orange-Mineral, 1100 lb cks NY .... lb.	...	.10½	.09½	.10½	.10¼	.12¾
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.70	.74	.70	.74	.70	.74
Orthochlorophenol, drs .... lb.	...	.32	.32	.75	.35	.75
Orthocresol, drs, wks ..... lb.	.16½	.17½	.13½	.17½	.13½	.14½
Orthodichlorobenzene, 1000 lb drs .... lb.	.06	.07	.06	.07	.05	.07
Orthonitrochlorobenzene, 1200 lb drs, wks .... lb.	.15	.18	15	.18	.28	.29
Orthonitroparachlorphenol, tins .... lb.	...	.75	...	.75	.70	.75
Orthonitrophenol, 350 lb drs .... lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks .... lb.	.08	.10	.08	.10	.07	.10
Orthotoluidine, 350 lb bbls, l-c-l .... lb.	.16	.17	.16	.17	.14	.17
Osage Orange, cryst, bbls .. lb.	.17	.25	.17	.25	.17	.25
51° liquid .... lb.	.07	.08	.07	.08	.07	.08
Paraffin, rfd, 200 lb bgs						
122-127° M P .... lb.	.03¾	.039	.03¾	.04½	.0445	.04½
128 132° M P .... lb.	.04	.0435	.04	.049	.04¾	.049
133-137° M P .... lb.	...	.0465	.0465	.05¾	.05½	.05¾
Para aldehyde, 99%, tech, 110-55 gal drs, delv .. lb.	...	.16	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs .... lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs .... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs .... lb.	.30	.45	.30	.45	.30	.45
Dichlorobenzene, 200 lb drs, wks .... lb.	.11	.12	.11	.12	.11	.20
Formaldehyde, drs, wks lb.	.34	.35	.34	.35	.34	.35
Nitroacetanilid, 300 lb bbls .... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks .... lb.	.45	.47	.45	.47	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks .... lb.	.15	.16	.15	.16	.23½	.24
Nitro-orthotoluidine, 300 lb bbls .... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.35	.37
Nitrosodimethylaniline, 120 lb bbls .... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.35	...	.35	...	.35
Phenylenediamine, 350 lb bbls .... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls .... lb.	.70	.75	.70	.75	.70	.75
tks, wks .... lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks .... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks .... lb.	.56	.58	.56	.58	.56	.58
Paris Green, dealers, drs .. lb.	.23	.26	.23	.26½	.22	.26½
Pentane, normal, 28-38° C, group 3, tks .... gal.	...	.08½	...	.08½	.08½	.09½
drs, group 3 .... gal.	.11½	.16	.11½	.16	.12½	.16
Perchlorethylene, 100 lb drs, frt all'd .... lb.	...	.10½	...	.10½	...	.10½
Petrolatum, dark amber, bbls .... lb.	.02⅝	.02¾	.02⅝	.03⅞	.02⅝	.03
Light, bbls .... lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
Medium, bbls .... lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls .... lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls .... lb.	.02½	.03⅝	.02½	.03⅝	.02⅛	.03¾
White, lily, bbls .... lb.	.05¼	.07⅛	.05¼	.07⅛	.06	.06¼
White, snow, bbls .... lb.	.06¼	.08⅛	.06¼	.08⅛	.07	.07¼
Petroleum Ether, 30-60°, group 3, tks .... gal.	...	.13	...	.13	...	.13
drs, group 3 .... gal.	.14	.17	.14	.17	.15	.17

PETROLEUM SOLVENTS AND DILUENTS

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Cleaners naphthas, group 3, tks, wks .... gal.	.06⅜	.06⅝	.06⅜	.07⅜	.06⅞	.07⅞
East Coast, tks, wks gal.	...	.10	...	.10	.09½	10
Hydrogenated, naphthas, frt all'd East, tks .... gal.	...	.16	...	.16	...	.16
No. 2, tks .... gal.	...	.18	...	.18	...	.18
No. 3, tks .... gal.	...	.16	...	.16	...	.16
No. 4, tks .... gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks, Bayonne .... gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks .... gal.	.07⅜	.07⅝	.07⅜	.08⅜	.07⅞	.08⅞
Naphtha, V.M.P., East, tks, wks .... gal.	...	.09½	.09½	.10	.10	.11
Group 3, tks, wks ... gal.	.06⅜	.06⅝	.06⅜	.07⅜	.06⅞	.07⅞
Petroleum thinner, 43-47, East, tks, wks .... gal.	.08½	.09	.08½	.10	.09	.10
Group 3, tks, wks ... gal.	.05⅜	.05⅝	.05⅜	.06⅜	.05⅞	.06⅞
Rubber Solvents, stand grd, East, tks, wks .... gal.	.09½	.10	.09½	.10	.09½	.10
Group 3, tks, wks ... gal.	.06⅜	.06⅝	.06⅜	.07⅜	.06⅞	.07⅞
Stoddard Solvent, East, tks, wks .... gal.	...	.10	.09½	.10	.09½	.10
Group 3, tks, wks ... gal.	.05⅞	.06⅛	.05⅞	.06⅞	.06⅜	.07⅜
Phenol, 250-100 lb drs .... lb.	.14½	.15½	.14½	.15½	.13¼	.15½
tks, wks .... lb.	...	.13½	...	.13½	.12¾	.13½
Phenyl-Alpha-Naphthylamine, 100 lb kgs .... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ..... lb.	...	.17	...	.17	.16	.17
Phenylhydrazine Hydrochlor-ide, com .... lb.	...	1.50	...	1.50	...	1.50

Prices

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Phloroglucinol, tech, tins . . lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins . . . . lb.	20.00	22.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis ton	...	1.85	...	1.85	...	1.85
70% basis . . . . . . ton	...	2.35	...	2.35	...	2.35
72% basis . . . . . . ton	...	2.85	...	2.85	...	2.85
75-74% basis . . . . ton	...	3.85	...	3.85	...	3.85
75% basis . . . . . . ton	...	5.50	...	5.50	...	5.50
Tennessee, 72% basis ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175						
lb cyl . . . . lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases . . . lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs . . lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl . . . . lb.	.15	.18	.15	.18	.15	.20
Yellow, 110 lb cs, wks . . lb.	.24	.30	.24	.30	.24	.33
Phthalic Anhydride, 100 lb						
drs, wks . . . . lb.	...	.14½	...	.14½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist . . . . lb.	.52	.55	.52	.55	.49	.65
Steam dist wat wh bbls gal.	...	.59	...	.59	.59	.79
tks . . . . gal.	...	.54	...	.54	.54	.74
Pitch Hardwood, wks . . . ton	18.25	18.75	18.25	18.75	15.00	18.75
Coaltar, bbls, wks . . . ton	...	19.00	...	19.00	...	19.00
Burgundy, dom, **bbls, wks** lb.	.05½	.06½	.05½	.06½	.03½	.06½
Imported . . . . lb.	.15	.16	.15	.16	.11	.16
Petroleum, **see Asphaltum in Gums' Section.**						
Pine, bbls . . . . bbl.	6.00	6.25	5.75	6.25	5.75	6.50
Stearin, drs . . . . . . lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, ref'd . . . . . . oz.	35.00	39.00	32.00	39.00	32.00	68.00

POTASH

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Potash, Caustic, wks, sol . . lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake . . . . lb.	.07	.07⅜	.07	.07⅜	.07	.07⅜
Liquid, tks . . . . . . lb.	...	.02⅞	...	.02⅞	...	.02⅞
Manure Salts, imported						
30% basis, blk . . . . unit	...	.58½	...	.58½	.55	.58½
Potassium Abietate, bbls . . lb.	...	.08	.08	.13	...	...
Acetate, tech, bbls, delv lb.	...	.26	.26	.28	.26	.28
Bicarbonate, USP, 320 lb						
bbls . . . . lb.	...	.18	...	.18	.09	.18
Bichromate Crystals, 725 lb						
cks* . . . . lb.	.08¾	.09¼	.08¾	.09¼	.08¾	.09
Binoxalate, 300 lb bbls . . lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs . . . lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800						
lb cks . . . . lb.	.06½	.07	.06½	.07	.06½	.07
liquid, tks . . . . . . lb.	...	.02⅞	...	.02⅞	.02¾	.02⅞
drs, wks . . . . lb.	.03	.03½	.03	.03½	.02⅞	.03½
Chlorate crys, 112 lb kgs,						
wks . . . . lb.	.09¼	.09½	.09¼	.09½	.09¼	.09½
gran, kgs . . . . lb.	.12	.13	.12	.13	.12	.13
powd, kgs . . . . lb.	.08½	.08¾	.08½	.08¾	.08½	.08¾
Chloride, crys, bbls . . . lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs . . . . . lb.	.19	.28	.19	.28	.28	.29
Cyanide, 110 lb cases . . . lb.	.50	.55	.50	.57½	.55	.57½
Iodide, 250 lb bbls . . . lb.	...	1.13	.93	1.13	.93	1.15
Metabisulfite, 300 lb bbls lb.	.12	.13½	.12	.15	.11	.15
Muriate, bgs, dom, blk unit	...	.53½	...	.53½	.50	.53½
Oxalate, bbls . . . . . lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks . . . lb.	.09	.10½	.09	.11½	.09½	.11
Permanganate, USP, crys,						
500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, bbls . . . lb.	.30½	.34	.30½	.37	.35	.37
Yellow, bbls . . . . . . lb.	.15	.16	.15	.16	.15	.18
Sulfate, 90% basis, bgs ton	...	38.00	...	38.00	...	36.25
Titanium Oxalate, 200 lb						
bbls . . . . lb.	.35	.40	.35	.40	.33	.40
Pot & Mag Sulfate, 48% basis						
bgs . . . . ton	...	25.75	...	25.75	24.75	25.75
Propane, group 3, tks . . . lb.	.03	.04⅛	.03	.04⅛	.03	.04⅛
Putty, coml, tubs . . . **100 lb.**	...	3.00	2.25	3.00	2.90	3.00
Linseed Oil, kgs . . . **100 lb.**	...	4.50	4.00	4.65	4.65	4.75
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt						
all'd . . . . gal.	6.40	6.75	5.00	6.75	4.15	5.25
3.6% pyrethrins, drs, frt						
all'd . . . . gal.	9.60	9.95	7.65	9.95	6.10	7.85
Flowers, coarse, Japan,						
bgs . . . . lb.	...	.27	.18	.28½	.12¾	.18
Fine powd, bbls . . . . lb.	...	.28	.19	.30	.14	.19
Pyridine, denat, 50 gal drs gal.	...	1.53	1.53	1.55	1.30	1.55
Refined, drs . . . . . . lb.	...	.45	...	.45	...	...
Pyrites, Spanish cif Atlantic						
ports, blk . . . . . . unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.75	2.15	2.75	2.15	2.75
Quebracho, 35% liq tks . . . lb.	...	.03⅜	.03	.03⅜	.02⅞	.03
450 lb bbls, c-l . . . . lb.	...	.04⅛	.03½	.04⅛	.03½	.03⅞
Solid, 63%, 100 lb bales						
cif . . . . lb.	...	.04	...	.04	.03⅞	.04
Clarified, 64%, bales . lb.	...	.04¼	...	.04¼	.04¼	.04⅛
Quercitron, 51 deg liq, 450 lb						
bbls . . . . lb.	.07½	.08½	.06	.08½	.06	.06½
Solid, drs . . . . lb.	.10	.12	.10	.12	.10	.12

R SALT

	Current Market		1938 Low	1938 High	1937 Low	1937 High
R Salt, 250 lb bbls, wks . . . lb.	.52	.55	.52	.55	.52	.55
Resorcinol tech, cans . . . . lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst . . . . . lb.	.17¾	.18¼	.15	.18¼	.14½	.15½
Powd, bbls . . . . lb.	.16¾	.17¼	.16	.18½	.13½	.16½
Rosin Oil, bbls, first run gal.	.45	.47	.45	.60	.52	.73
Second run . . . . gal.	.47	.49	.47	.62	.54	.75
Third run, drs . . . . . . gal.	.51	.53	.51	.66	.58	.79

* Spot price is ½c higher.

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	...	5.35	4.65	6.00	5.50	10.00
D	...	5.40	4.90	6.00	5.50	10.35
E	...	5.65	4.95	6.00	5.75	10.25
F	...	6.60	5.30	7.00	6.87½	10.80
G	...	6.70	5.50	7.05	6.87½	10.85
H	...	6.70	5.55	7.15	6.90	10.85
I	...	6.70	5.60	7.15	6.95	10.90
K	...	6.70	5.65	7.25	6.95	10.90
M	...	6.70	5.65	7.40	7.05	11.00
N	...	7.15	6.20	7.50	7.10	11.05
WG	...	7.40	6.80	8.45	7.65	11.75
WW	...	7.85	7.70	9.15	8.00	13.75
Rosins, Gum, Savannah (280 lb unit):						
B	...	3.95	3.25	4.60	4.25	8.75
D	...	4.00	3.50	4.60	4.25	9.00
E	...	4.25	3.55	4.60	4.25	9.10
F	...	5.10	3.90	5.60	5.50	9.55
G	...	5.20	4.10	5.65	5.60	9.60
H	...	5.20	4.20	5.75	5.70	9.60
I	...	5.20	4.20	5.85	5.70	9.65
K	...	5.20	4.20	6.00	5.70	9.65
M	...	5.20	4.20	6.15	5.80	9.75
N	...	5.65	4.80	6.20	5.85	9.75
WG	...	6.00	5.40	7.05	6.40	10.50
WW	...	6.45	6.10	7.75	6.75	12.50
X	...	6.45	6.10	7.75	6.75	12.50
Rosin, Wood, c-l, FF grade, NY	5.35	6.05	5.05	6.40	6.40	10.72
Rotten Stone, bgs mines ..ton	...	35.00	...	35.00	...	35.00
Imported, lump, bbls ...lb.	...	.12	...	.12	...	...
Powdered, bbls ......lb.	.08½	.10	.08½	.10	...	...

SAGO FLOUR

Sago Flour, 150 lb bgs ...lb.	.02½	.03½	.02½	.03¾	.02¾	.03¾
Sal Soda, bbls, wks ...100 lb.	...	1.20	...	1.20	1.15	1.20
Salt Cake, 94-96%, c-l, wks ton	19.00	23.00	19.00	23.00	19.00	23.00
Chrome, c-l, wks ......ton	11.00	12.00	11.00	12.00	11.00	12.00
Saltpetre, gran, 450-500 lb bbls ....lb.	.06½	.069	.06½	.069	.06	.069
Cryst, bbls ....lb.	.07½	.0865	.07½	.0865	.07	.0865
Powd, bbls ....lb.	.07½	.079	.07½	.079	.07	.079
Satin, White, pulp, 550 lb bbls ....lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs ......lb.	.46	.48	.46	.48	.46	.48
Shellac, Bone dry, bbls ..lb. r	.19	.20	.16½	.20	.17	.22
Garnet, bgs ....lb.	.12½	.13	.12½	.15	.14	.17
Superfine, bgs ....lb. s	.11½	.12	.11½	.13½	.13	.18½
T. N., bgs ....lb. s	.11	.11½	.11	.12½	.12	.14½
Silver Nitrate, vials ......oz.	.31½	.33½	.33½	.34⅞	.32⅝	.35½
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ....100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs .....100 lb.	...	1.08	...	1.08	...	1.08
blk ....100 lb.	...	.90	...	.90	...	.90
paper bgs ....100 lb.	...	1.05	...	1.05	...	1.05
bbls ....100 lb.	...	1.35	...	1.35	...	1.35
Caustic, 76% grnd & flake, drs ....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs .....100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks ..100 lb.	...	1.97½	...	1.97½	...	1.97½
Sodium Abietate, drs .....lb.	...	.10	.10	.13	.08	.13
Acetate, 60% tech, gran, powd, flake, 450 lb bbls, wks ....lb.	.04	.05	.04	.05	.04¼	.05
anhyd, drs, delv .....lb.	...	.08¼	...	.08¼	...	...
Alignate, drs ....lb.	...	.69	...	.69	.64	.69
Antimoniate, bbls ......lb.	.12	.12½	.12	.15¼	.13¾	.16¼
Arsenate, drs ....lb.	.08	.08½	.08	.08½	.08	.11½
Arsenite, liq, drs ......gal.	.30	.33	.30	.33	.33	.40
Dry, gray, drs, wks ..lb.	.07½	.09½	.07½	.09½	...	...
Benzoate, USP, kgs ....lb.	.46	.48	.46	.48	.46	.48
Bicarb, powd, 400 lb bbl, wks ....100 lb.	...	1.85	...	1.85	1.75	1.85
Bichromate, 500 lb cks, wks* ....lb.	.06¾	.07¼	.06¾	.07¼	.06½	.07¼
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	1.40	1.80	...	.
Chlorate, bgs, wks ......lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks ......lb.	.14	.15	.14	.17½	.15½	.17½
Diacetate, 33-35% acid, bbls, lcl, delv ....lb.	...	.09	...	.09	...	...
Fluoride, white 90%, 300 lb bbls, wks ....lb.	.07½	.08¼	.07½	.08¼	.07½	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks ....lb.	.16	.17	.16	.17	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	...	2.80	2.50	2.80	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks ......100 lb.	2.45	2.80	2.40	2.80	2.40	2.75
Iodide, jars ....lb.	...	2.10	1.90	2.10	1.90	1.95
Metal, drs, 280 lbs. .....lb.	.	.19	...	.19	...	.19
Metanilate, 150 lb bbls ..lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks ....100 lb.	...	2.20	2.15	2.20	...	2.15
cryst, drs, c-l, wks 100 lb.	...	2.90	2.75	2.90	...	2.75
Monohydrate, bbls .....lb.	...	.023	...	.023	...	.023
Naphthenate, drs ......lb.	.12	.19	.12	.19	.09	.19
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case. s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ⅛c higher.

	Current	Market	1938 Low	1938 High	1937 Low	1937 High
Sodium (continued):						
Nitrate, 92%, crude, 200 lb bgs, c-l, NY ....ton	...	28.30	...	28.30	26.80	28.30
100 lb bgs ....ton	...	29.00	...	29.00	27.50	29.00
Bulk ....ton	...	27.00	...	27.00	25.50	27.00
Nitrite, 500 lb bbls .....lb.	.06¾	.11½	.06¾	.11½	.07	.10
Orthochlorotoluene, sulfonate, 175 lb bbls, wks ..lb.	.25	.27	.25	.27	.25	.27
Perborate, drs, 400 lbs ..lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb ...lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.05	...	2.05	1.90	2.05
bgs, wks ......100 lb.	...	1.85	...	1.85	1.70	1.85
Tri-sodium, tech, 325 lb bbls, wks ....100 lb.	...	2.20	...	2.20	2.05	2.20
bgs, wks ....100 lb.	...	2.00	...	2.00	1.85	2.00
Picramate, 160 lb kgs ...lb.	.65	.67	.65	.67	.65	.67
Prussiate, Yellow, 350 lb bbl. wks ....lb.	.09½	.10	.09	.11½	.10	.11½
Pyrophosphate, anhyd, 100 lb bbls fob wks frt eq lb.	...	.0610	.0610	.10	...	.10
Sesquisilicate, drs, c-l, wks ....100 lb.	...	2.80	2.80	3.00	...	...
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 55 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	.04¾	.05	.04¾	.06½	.05¾	.07
Stannate, 100 lb drs ....lb.	.31	.34	.25½	.34	.28	.44
Stearate, bbls ....lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks ....100 lb. †	1.45	1.90	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb bbls, wks ....lb.	...	.02¼	...	.02¼	...	.02¼
Solid, 650 lb drs, c-l, wks ....lb.	...	.03	...	.03	...	.02
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs ......lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls ...lb.	...	.12	...	.12	...	.12
Tungstate, tech, crys, kgs lb.	1.05	1.10	1.05	1.35	.85	.90
Sorbitol, com, solut., wks, c-l drs, wks ....lb.	...	.17	.17	.19	...	.25
Spruce Extract, ord, tks ..lb.	...	.01⅛	...	.01⅛	.01	.01⅛
Ordinary, bbls ....lb.	...	.01⅝	...	.01⅝	.01½	.01⅝
Super spruce ext, tks ...lb.	...	.01⅜	...	.01⅜	.01⅜	.01⅝
Super spruce ext, bbls ..lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	...	.04	.04	.04¼
Starch, Pearl, 140 lb bgs 100 lb.	2.40	2.60	2.40	3.18	2.93	4.53
Powd, 140 lb bgs ...100 lb.	2.50	2.70	2.50	3.28	3.03	4.63
Potato, 200 lb bgs ......lb.	.04	.05	.03½	.05½	.04½	.05½
Imp, bgs ....lb.	.05	.06	.05	.06	.05	.06
Rice, 200 lb bbls ....lb.	.06¼	.07¼	.06¼	.07¼	...	.07¼
Wheat, thick, bgs ......lb.	.06¼	nom.	.06¼	.07	.07	.08½
Strontium carbonate, 600 lb bbls, wks ....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¼	.07¾	.09¼	.07¾	.08¾
Sucrose octa-acetate, den, grd, bbls, wks ....lb.	...	.45	...	.45	...	.45
tech, bbls, wks ....lb.	...	.40	...	.40	...	.40
Sulfur, crude, f.o.b. mines ton	...	16.00	16.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.65	2.35	1.65	2.35	1.65	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.85	3.00	2.85	3.00	2.85	3.00
Superfine, bgs ......100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ....lb.	.03	.04	.03	.04	.02½	.04
Sulfur Dioxide, 150 lb cyl..lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks .....lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks ....lb.	.04	.05	.04	.05	.04	.05
Refrigeration, cyl, wks..lb.	.16	.17	.16	.17	.15	.17
Multiple units, wks ....lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ......ton	...	66.00	62.00	68.00	58.50	65.00
Extract, 42°, bbls ......lb.	.05¼	.06¼	.05¼	.06¼	.05¼	.06¼
Superphosphate, 16% bulk, wks ....ton	...	8.00	8.00	9.00	8.25	9.00
Run of pile ....ton	...	7.50	7.50	8.50	8.00	8.50
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit ......ton	...	.70	.70	.85	.70	.85
Talc, Crude, 100 lb bgs, NY ton	13.00	15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	16.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	23.00	30.00
Ref'd, white, bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00	62.00	60.00	62.00	60.00	62.00
Ref'd, white, bgs, NY ton	65.00	70.00	65.00	70.00	65.00	70.00
Tankage Grd, NY .....unit ‡	...	2.75	2.50	3.00	3.00	4.40
Ungrd ....unit ‡	...	2.75	2.35	3.00	2.80	4.35
Fert grade, f.o.b. Chgo unit ‡	...	2.65	2.25	2.65	2.75	4.00
South American cif ..unit ‡	...	3.10	3.00	3.45	3.15	4.25
Tapioca Flour, high grade, bgs ....lb.	.02	.05½	.02	.05½	.03¼	.05½
Tar Acid Oil, 15%, drs ..gal.	.22	.25	.22	.25½	.21	.25½
25%, drs ....gal.	.25½	.28½	.25½	.29½	.24½	.29½
Tar, pine, delv, drs .....gal.	...	.26	...	.26	...	.26
tks, delv, E. cities .....gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech, bbls..lb.	.27¾	.28	.26¾	.28	.24¾	.27
USP, bbls ....lb.	.33	.33½	.32	.33½	.30	.32½

† Bags 15c lower; ‡ + 10; ***Bbls. are 20c higher.**

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Terpineol, den grade, drs . . lb.	. . .	.17	. . .	.17	.13¾	.14¾
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene, drs,						
tech . . . . lb.	. . .	.09½	. . .	.09½	. . .	.10½
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbls . . lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	.36	.36½	.31	.36½	.33	.46
Metal, NY . . . . lb.	. . .	.46	.3570	.46	.41	.66
Oxide, 300 lb bbls, wks . . lb.	.50	.52	.44	.50	.48	.62
Tetrachloride, 100 lb drs,						
wks . . . . lb.	. . .	.23½	.18½	.23½	.21	.32
Titanium Dioxide, 300 lb bbls lb.	.15¼	.16	.15¼	.17	.16¼	.17
Barium Pigment, bbls . . lb.	.05⅝	.05⅞	.05⅝	.06⅜	.06	.06⅜
Calcium Pigment, bbls . . lb.	.05⅝	.05⅞	.05⅝	.06⅜	.06	.06⅜
Toluidine, mixed, 900 lb drs,						
wks . . . . lb.	.26	.27	.26	.27	.26	.27
Toluol, 110 gal drs, wks . . gal.	. . .	.27	.27	.35	. . .	.35
8000 gal tks, frt all'd . . gal.	. . .	.22	.22	.30	. . .	.30
Toner Lithol, red, bbls . . . . lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls . . . . lb.	.75	.80	.75	.80	. . .	.75
Toluidine, bgs . . . . lb.	. . .	1.35	. . .	1.35	. . .	1.35
Triacetin, 50 gal drs, wks lb.	. . .	.36	. . .	.36	. . .	.36
Triamyl Borate, lcl, drs, wks lb.	. . .	.27	. . .	.27	. . .	.27
Triamylamine, c-l, drs, wks lb.	.77	1.25	.77	1.25	.77	1.25
Tributylamine, lcl, drs, wks lb.	. . .	.70	. . .	.70	. . .	. . .
Tributyl citrate, drs, frt all'd lb.	. . .	.45	. .	.45	. . .	.45
Tributyl Phosphate, frt all'd lb.	. . .	.42	.42	.50	. . .	.50
Trichlorethylene, 600 lb drs,						
frt all'd E. Rocky Mts . . lb.	.09	.09½	.089	.09½	.089	.094
Tricresyl phosphate, tech, drs lb.	.23	.37½	.23	.39	.22½	.26½
Triethanolamine, 50 gal drs						
wks . . . . lb.	.21	.22	.21	.22	.21	.30
tks, wks . . . . lb.	. . .	.20	. . .	.20	.20	.25
Triethylene glycol, drs, wks lb.	. . .	.26	. . .	.26	. . .	. . .
Trihydroxyethylamine Oleate,						
bbls . . . . lb.	. . .	.30	. . .	.30	. . .	. . .
Stearate, bbls . . . . lb.	. . .	.30	. . .	.30	. . .	. . .
Trimethyl Phosphate, drs,						
lcl fob dest . . . . lb.	. . .	.50	. . .	.50	. . .	. . .
Trimethylamine, c-l, drs, frt						
all'd E. Mississippi . . . . . lb.	. . .	1.00	. . .	1.00	. . .	1.00
Triphenylguanidine . . . . . . lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs . . lb.	. . .	.38	.34	.38	. . .	. . .
Tripoli, airfloated, bgs, wks ton	26.00	30.00	26.00	30.00	25.00	30.00
Turpentine (Spirits), c-l, NY						
dock, bbls . . . . gal.	. . .	.30¼	.26½	.31½	.31	.47
Savannah, bbls . . . . gal.	. . .	.24¼	.20½	.30¾	.25	.42
Jacksonville, bbls . . . . . . gal.	. .	.23	.20½	.30¾	.25	.41
Wood Steam dist, bbls, c-l,						
NY . . . . gal.	. . .	.27	.27	.31	.30	.44
Wood, dest dist, c-l, drs,						
delv E. cities . . . . gal.	.22	.24	.22	.36	. . .	. . .
Urea, pure, 112 lb cases . . lb.	.14½	.15½	.14½	.15½	.14½	.15½
Fert grade, bgs, c.i.f. . . ton	. . .	. . .	. . .	. . .	. . .	. . .
c.i.f. S.A. points . . . . ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom, f.o.b., wks . . . . . ton	95.00	101.00	95.00	101.00	95.00	101.00
Urea Ammonia liq 55% NH_3,						
tks . . . . unit	. . .	nom.	1.00	1.04	1.00	1.04
Valonia beard, 42%, tannin						
bgs . . . . ton	. . .	46.00	45.00	52.00	35.00	52.00
Cups, 32% tannin, bgs . . ton	. . .	31.00	30.00	37.50	31.50	36.00
Extract, powd, 63% . . . . lb.	. . .	.06	. . .	.06	. . .	. . .
Vanillin, ex eugenol, 25 lb						
tins, 2000 lb lots . . . . . lb.	. . .	2.10	2.10	3.10	3.10	3.65
Ex-guaiacol . . . . lb.	. . .	2.00	2.00	3.00	3.00	3.55
Ex-lignin . . . . lb.	. . .	2.00	2.00	2.25	. . .	. . .
Vermilion, English, kgs . . lb.	1.50	1.64	1.45	1.69	1.60	1.90
Wattle Bark, bgs . . . . ton	38.00	40.00	39.00	41.75	31.00	43.75
Extract, 60°, tks, bbls . . lb.	. . .	.04⅜	.04⅜	.04⅝	.03⅝	.04⅝
WAXES						
Wax, Bayberry, bgs . . . . . lb.	.16⅞	.17	.16⅞	.17	.16½	.17½
Bees, bleached, white 500						
lb slabs, cases . . . . lb.	.37	.39	.35	.45	.38	.45
Yellow, African, bgs . . lb.	.20½	.21	.20½	.26	.25	.30
Brazilian, bgs . . . . . lb.	.22	.23	.22	.29	.27	.34
Chilean, bgs . . . . lb.	.22	.23	.22	.29	.27	.34
Refined, 500 lb slabs, cases lb.	.32½	.33	.32	.39	.29½	.39
Candelilla, bgs . . . . lb.	.15¼	.15¾	.13½	.16	.13	.16½
Carnauba, No. 1, yellow,						
bgs . . . . lb.	.40	.41½	.38	.44	.42	.49
No. 2, yellow, bgs . . . . lb.	.39	.39½	.36	.42	.41	.46½
No. 2, N. C., bgs . . . . . lb.	.37	.37½	.35½	.40	.38	.43
No. 3, Chalky, bgs . . . lb.	.31	.34	.31	.35½	.33	.40
No. 3, N. C., bgs . . . . . lb.	.31½	.34	.31½	.35½	.34	.43
Ceresin, dom, bgs . . . . . . lb.	.08½	.11½	.08½	.11½	.08	.12
Japan, 224 lb cases . . . . . lb.	.10¼	.10½	.09¼	.11	.09½	.11¼
Montan, crude, bgs . . . . . lb.	.11	.11¾	.11	.12⅛	.11	.12
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.22	.23	.22	.24	.23	.24
Cakes, cases . . . . lb.	.23	.24	.23	.25	.24	.25
Whiting, chalk, com, 200 lb bgs						
c-l, wks . . . . ton	12.00	14.00	12.00	14.00	12.00	14.00
Gilders, bgs, c-l, wks . . ton	. . .	15.00	. . .	15.00	. . .	15.00
Wood Flour, c-l, bgs . . . . . ton	20.00	33.00	20.00	33.00	18.00	30.00
Xylol, frt allowed, East 10°						
tks, wks . . . . gal.	. . .	.29	.29	.33	. . .	.33
Coml, tks, wks, frt all'd gal.	. . .	.26	.26	.30	. . .	.30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36
Zinc Acetate, tech, bbls, lcl,						
delv . . . . lb.	. . .	.21	. . .	.21	. . .	. . .
Arsenate, bgs, frt all'd . . lb.	.12½	.13	.12½	.13½	. . .	. . .
Arsenite, bgs, frt all'd . . lb.	.12½	.13	.12½	.13	. . .	. . .
Carbonate tech, bbls, NY lb.	.14	.15	.14	.15	.12	.15
Chloride fused, 600 lb drs,						
wks . . . . lb.	.04¼	.046	.04¼	.046	.04½	.046
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	. . .	2.25	. . .	2.25	2.00	2.25
Cyanide, 100 lb drs . . . . . lb.	. . .	.33	.33	.38	.36	.38
Dust, 500 lb bbls, c-l, delv lb.	. . .	.0705	.06	.0740	.0740	.094

Prices—Current

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Zinc (continued):						
Metal, high grade slabs, c-l,						
NY ....100 lb.	...	5.45	4.35	5.45	5.35	7.85
E. St. Louis . . 100 lb.	...	5.05	4.00	5.05	5.00	7.50
Oxide, Amer, bgs, wks . . lb.	.06¼	.07½	.06	.07½	.05¼	.07¾
French 300 lb bbls, wks lb.	.06½	.07¾	.06¼	.07¾	.05½	.07¾
Palmitate, bbls ....lb.	.23	.25	.23	.25	.23	.25
Resinate, fused, pale, bbls lb.	...	.10	..	.10	.09	.10
Stearate, 50 lb bbls .....lb.	.20	.23	.20	.23	.20	.23
Zinc Sulfate, crys, 400 lb bbl,						
wks ....lb.	...	.029	.029	.033	.028	.033
Flake, bbls ....lb.	...	.0325	.0325	.0375	.032	.0375
Sulfide, 500 lb bbls, delv lb.	.08⅝	.08⅞	.08⅝	.09¾	.09¼	.09¾
bgs, delv ....lb.	.08⅜	.08⅝	.08⅜	.09	.09	.09½
Sulfocarbolate, 100 lb kgs						
....................lb.	.24	.26	.24	.26	.24	.26
Zirconium Oxide, crude, 73-75%						
grd, bbls, wks ....ton	75.00	100.00	75.00	100.00	...	...
kgs, wks ....lb.	.04¼	.04½	.04¼	.04½	...	...

Oils and Fats

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Babassu, tks, futures .....lb.	...	.06¼	.06¼	.06¾	.06¾	.11¼
Castor, No. 3, 400 lb bbls . . lb.	.09¼	.10	.09¼	.10¼	.10¼	.10¾
Blown, 400 lb bbls .....lb.	.11¼	.12	.11¼	.13	.12¼	.13
China Wood, drs, spot NY lb.	.15	nom.	.10¼	.15¼	.12½	.23
Tks, spot NY ....lb.	.15	nom.	.095	.15½	.118	.23
Coconut, edible, bbls NY . . lb.	...	.09	.09	.09½	.09½	.15
Manila, tks, NY ....lb.	...	.03⅛	.03⅛	.04¼	.04	.09½
Tks, Pacific Coast .....lb.	.02¾	.02⅞	.02¾	.03¾	.03¾	.08⅞
Cod, Newfoundland, 50 gal						
bbls ....gal.	.38	nom.	.38	.52	.51	.52
Copra, bgs, NY ....lb.	...	.0185	.0185	.0235	.0235	.055
Corn, crude, tks, mills ....lb.	.06⅝	.06⅞	.06⅝	.08¼	.06½	.10¾
Refd, 375 lb bbls, NY .lb.	.09⅝	.09⅞	.09¼	.10½	.09	.13¼
Degras, American, 50 gal bbls,						
NY ....lb.	07¾	.08¼	.07½	.08¼	.07½	.08¼
English, bbls, NY ......lb.	.07¾	.08¼	.07½	.08¼	.07½	.08¼
Greases, Yellow ....lb.	.04⅝	.04¾	.03½	.05½	.04½	.09
White, choice bbls, NY . . lb.	.05⅜	.05¾	.05	.07	.06¾	.10¼
Lard Oil, edible, prime ....lb.	...	.11½	.11⅛	.12¾	.12¾	.16¾
Extra, bbls ....lb.	...	.09⅛	.09	.10¾	.10¾	.13½
Extra, No. 1, bbls ......lb.	...	.09	.08¾	.09¾	.09¼	.13½
Linseed, Raw less than 5 bbl						
lots ....lb.	.091	.094	.089	.115	.107	.121
bbls, c-l, spot ....lb.	.083	.086	.081	.102	.099	.113
Tks ....lb.	.0770	.08	.07½	.096	.093	.107
Menhaden, tks, Baltimore gal.	.30	nom.	.34½	.37½	.34	.45
Refined, alkali, drs .....lb.	.069	.0710	.067	.095	.08	.10
Tks ....lb.	...	.063	.061	.087	.074	.09
Kettle bodied, drs ......lb.	.078	.08	.076	.105	.09	.11
Light pressed, drs ......lb.	.063	.065	.061	.091	.074	.094
Tks ....lb.	...	.057	.05½	.08	.067	.084
Neatsfoot, CT, 20°, bbls, NY						
....................lb.	...	.15¼	.15¼	.17¼	.16¾	.18¼
Extra, bbls, NY ....lb.	...	.09¼	.09	.10	.09½	.13¾
Pure, bbls, NY ....lb.	...	.11¾	.11¾	.12¼	.11¾	.14¼
Oiticica, bbls ....lb.	.11¼	.11¾	.09¼	.12¾	.10⅞	.17
Oleo, No. 1, bbls, NY ....lb.	...	.09	.08½	.10½	.10½	.14½
No. 2, bbls, NY .....lb.	...	.08¼	.08	.10	.10	.14
Olive, denat, bbls, NY ...gal.	.88	.90	.88	1.20	1.15	1.65
Edible, bbls, NY ......gal.	1.75	2.00	1.75	2.35	2.20	2.50
Foots, bbls, NY ....lb.	.07	.07¼	.07	.09⅞	.09⅝	.12½
Palm, Kernel, bulk ....lb.	...	.0365	.0365	.04½	.04½	.08⅛
Niger, cks ....lb.	.07	.07¼	.07	.09⅞	.09⅝	.12½
Sumatra, tks ....lb.	. .	.02¾	.02¾	.0375	.0375	.06½
Peanut, crude, bbls, NY . . lb.	.07	.07¼	.07	.08¼	.06¼	.10⅝
Tks, f.o.b. mill ....lb.	.06¾	.07	.06⅝	.08	.06½	.10¼
Refined, bbls, NY ......lb.	.10	.10¼	.09¾	.10¾	.10	.13½
Perilla, drs, NY ....lb.	.10	.10¼	.09¾	.11¾	.11	.13½
Tks, Coast ....lb.	.09½	.0960	.09	.11	.105	.13
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.14	.14½	.14	.14¾	.13	.14¾
Denatured, drs, NY ...gal.	.78	.80	.75	.91	.85	.97
Red, Distilled, bbls ....lb.	...	.08⅜	.08⅜	.10⅝	.09⅝	.12⅝
Tks ....lb.	...	.07½	.07½	.09¾	.08¾	.10¾
Sardine, Pac Coast, tks . . gal.	. .	.28	.28	.46½	.35	.55
Refined alkali, drs .....lb.	.069	.071	.067	.095	.08	.10
Tks ....lb.	. .	.063	.061	.087	.074	.09
Light pressed, drs ......lb.	.063	.067	.061	.089	.074	.094
Tks ....lb.	...	.057	.05½	.08	.067	.084
Sesame, yellow, dom .....lb.	...	.10½	.10¼	.10½	.10¼	.13¼
White, dom ....lb.	...	.10½	.10¼	.10½	.10¼	.13¼
Soy Bean, crude						
Dom, tks, f.o.b. mills ...lb.	.05¾	.05⅞	.05⅞	.07	.06	.10½
Crude, drs, NY ......lb.	.0635	.07	.06½	.08	.066	.11½
Ref'd, drs, NY ....lb.	.0755	.0825	.07⅝	.097	.078	.12½
Tks ....lb.	.0675	.0685	.0685	.082	.072	.11½
Sperm, 38° CT, bleached, bbls						
NY ....lb.	.10	.102	.10	.102	.096	.102
45° CT, bleached, bbls,						
NY ....lb.	.093	.095	.093	.095	.089	.095
Stearic Acid, double pressed						
dist bgs ....lb.	.10½	.11	.10½	.12	.11	.13½
Double pressed saponified						
bgs ....lb.	.10¾	.11¾	.10¾	.12¼	.11¼	.13¾
Triple pressed dist bgs . . lb.	.13½	.14½	.13½	.15	.14	.16½
Stearine, Oleo, bbls ......lb.	.07	.07¼	.05½	.08½	.07	.11½
Tallow City, extra loose ...lb.	. . .	.05⅛	.04¾	.06⅜	.05⅞	.09¼
Edible, tierces ....lb.	.07½	.07⅝	.06	.07⅝	.06⅞	.10¼
Acidless, tks, NY ......lb.	...	.08	.08	.09¼	.09	.13
Turkey Red, single, bbls . . lb.	.06¼	.08½	.06¼	.08½	.08	.08½
Double, bbls ....lb.	.09½	.11	.09½	.13	.12½	.13
Whale:						
Winter bleach, bbls, NY lb.	.081	.083	.081	.10	.091	.111
Refined, nat. bbls, NY . . lb.	.077	.079	.077	.096	.087	.107

Index to Advertisers

"We"—Editorially Speaking

Speaking, as it very properly should, about the Chemists' Club, *The Percolator* says: "There are two round tables . . . No one has a reserved seat at either . . . roundness places all who come on a plane of equality." These pretty communistic sentiments are not quite exactly correct. At the "low table" the seat that, like the prayer rug of the good Mohammedan, faces due East is permanently and irrevocably reserved so that we will venture a wager the Club Editor dare not try to usurp it between 12:30 and 1.15 any day. As for the roundness of the "high table" —well, "where MacGregor sits is the head of the table," and the whole Club knows who MacGregor is.

Do you remember these brands of well known chemicals made by well known companies—

Naproco
Niagalk
Albasol

To H. R. H. Princess Alexandra Kropotkin the whole chemical fraternity owes thanks for warming up the following sauce for our Thanksgiving turkey:

"Thank the American Chemical Society for relieving us of *one* war dread. The chemists assure us that acetone—an ingredient equally necessary to the manufacture of high explosives and fingernail paint—is now plentiful and cheap, due to improved production methods . . . Henceforth, if war comes, we no longer need fear that the emergency may deprive us of our digital glow"—in *Liberty* for October 22, 1938.

A single company in the plastics industry is boasting that it has produced over twenty million molded images of Mickey Mouse in full color in three years. That's an average of some 3,200 per working day—an awe-inspiring thought on two or three counts.

The *bon mot* of the month goes without question to H. O. Chute, who comments caustically on distillery apparatus:

"The 'ten panels with buttons' reveal the modern tendency to operate plants with buttons; in prewar days they were operated with brains."

Add to the next Chemical Dictionary—Supersalesman: A man from the home office with a better price.

Prize of the month for intelligent and effective chemical publicity goes without a qualm to du Pont for their full page on Nylon, released in the Sunday newspapers of October thirtieth.

Eighteen months of hard labor went into our new BUYER'S GUIDEBOOK NUMBER with its three new sections, and that's not counting the five years during which we have been painstakingly building up that dictionary of chemical and brand names. Now you've seen it—wasn't it worth it?

Echo answers YES!

The new edition was compiled from the direct answers to 13,996 questionnaires to raw material dealers, chemical producers, and chemical specialty manufacturers.

Practically one-third of the firms have some change in name or address. Practically every firm has changes in its products. The entire specialty buying section is new and obtainable nowhere else. And there are more than 18,000 brand and trade names, over 4,000 scientific and commercial synonyms in the Index.

Enough of statistics!

Speaking of chemical specialties, as we have been of late, just 40 years ago, the Standard Oil Co., Specialty Department, 408 W. 14th st., New York, had a quarter-page advertisement in the *"O.P.D."* of Excelsior Cheese Covering: Prevent-Mould, Loss-in-Weight, Skippers, Decomposition, and was guaranteed not to become RANCID.

Did you know—

That one cent placed at 4% compound interest the year 1 A.D. would require 36 world's weight of pure gold for redemption in this year of grace?

That the total increase in the national wealth of Great Britain during the past century has been at the rate of 1¼% and of the United States only 1⅞%?

That the most important factors in the inability of the world to earn even 2% interest is not wars, floods, and famines; but our very familiar friends Old Man Depreciation and his pal Obsolescence?

That a new type of glass can be drawn into a fibre finer than any known organic filament, finer in fact than the finest silk fibre or spider's web?

A new formula tin-lead solder has a tensile strength of 9500 lbs. per square inch?

That pyrethrum is face to face with a new synthetic fly spray base said to be non-staining, non-odorous, and non-poisonous to animals, including *Homo sapiens?*

Add to the New Uses Department the sale of enamel to Fiji Islanders as a substitute for tattooing. Reported by *Drugs, Oils and Paints.*

And "We" suggest that this looks as if there may be a good business opportunity for a first class face lifter in Fiji in a couple of years.

Fifteen Years Ago

From our issues of November, 1923

The 1924 *Drug & Chemical Markets Guide-Book* is just off the press —Editor's note: the 1938 *Chemical Industries Buyer's Guidebook Number* is just off the press and is nearly three times greater in size.

B. M. Spencer and B. J. Gogarty announce plans for the fall frolic of the Druachem Club.

Wishnick-Tumpeer Chemical Co. has moved its offices to 130-44th St., Brooklyn.

B. P. Steele, recently with W. F. George Chemicals, is now with Edw. Hall's Son & Co., Chicago.

Alex C. Fergusson, Jr., is elected president of the Philadelphia Chemical Club.

Milton Kutz and Ralph E. Dorland discuss contracts before the November meeting of the Salesmen's Association of the American Chemical Industry.

J. O. Hammett, E. V. O'Daniel and W. S. Stowell have been elected directors of American Cyanamid Co.

Dr. Charles H. Herty, president, S. O. C. M. A., speaks before the Society of Chemical Industry in Montreal.

CHEMICAL INDUSTRIES
Statistical and Technical Data Section
Part 2

State of Chemical Trade

Current Statistics (October 31, 1938)—p. 21

WEEKLY STATISTICS OF BUSINESS

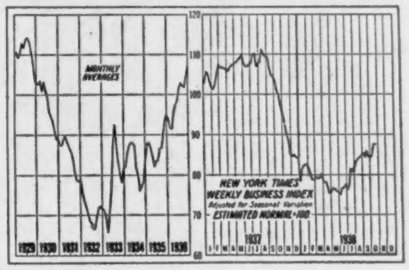
Week Ending	Carloadings 1938	Carloadings 1937	Carloadings % of Change	Electrical Output* 1938	Electrical Output* 1937	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.
Oct. 1	697,938	843,861	—17.3	2,139,142	2,275,724	— 6.0	76.2	94.2	58.6	70.8	78.1	73.1	76.9	47.9	84.2
Oct. 8	702,964	812,258	—13.4	2,154,449	2,280,065	— 5.5	76.3	93.4	57.5	70.4	78.1	73.2	76.7	51.4	84.9
Oct. 15	726,612	806,095	— 9.9	2,182,751	2,276,123	— 4.1	75.8	93.6	57.0	70.5	77.7	72.7	76.7	49.4	87.7
Oct. 22	705,628	770,156	— 8.4	2,214,097	2,281,636	— 3.0	75.4	93.6	55.6	70.4	77.7	72.3	76.7	53.7	87.7
Oct. 29	......	....	....	2,226,038	2,254,947	— 1.3	76.0	93.6	55.5	70.5	77.7	72.9	....	56.8	....

* K.W.H. 000 omitted; † Calendar year 1926 = 100.

MONTHLY STATISTICS

CHEMICAL:	September 1938	September 1937	August 1938	August 1937	July 1938	July 1937
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	....	188,252	131,106	179,008	109,969	166,927
Consumpt. in mfr. fert.	....	144,273	128,312	168,015	92,189	140,230
Stocks end of month	....	71,767	85,787	67,167	88,392	75,583
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof. gal.	15,799,687	17,219,398	17,284,176	17,067,262	16,370,040	18,253,750
Comp. denat. prod., wine gal.	2,619,783	4,806,615	1,502,022	1,813,306	1,303,324	1,027,067
Removed, wine gal.	2,569,815	4,648,767	1,444,159	1,780,507	1,268,542	926,013
Stocks end of mo., wine gal.	865,730	1,142,699	809,403	989,666	732,896	957,886
Spec. denat. prod., wine gal.	6,561,614	6,706,038	6,343,681	6,118,283	5,407,884	5,725,806
Removed, wine gal.	6,554,205	6,656,398	6,203,793	6,242,660	5,456,310	5,657,649
Stocks end of mo., wine gal.	600,591	778,597	606,897	733,920	437,548	864,396
Ammonia sulfate prod., tons *a*	36,381	68,940	34,898	72,499	30,482	69,204
Benzol prod., gal. *b*	6,056,000	10,765,000	5,585,000	11,144,000	4,769,000	10,762,000
Byproducts coke, prod., tons *a*	2,675,089	4,426,375	2,494,471	4,571,062	2,176,612	4,422,106
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prods., lbs.	691,688	1,146,391	725,363	1,256,363	457,492	1,019,657
Sheets, ship., lbs.	722,699	1,239,549	722,518	1,203,266	523,072	992,918
Rods, prod., lbs.	207,256	242,412	178,860	300,663	142,715	193,791
Rods, ship., lbs.	233,921	365,340	235,948	288,360	162,200	330,996
Tubes, prod., lbs.	74,937	116,956	52,283	85,292	33,371	67,607
Tubes, ship., lbs.	73,702	87,017	58,209	66,649	45,722	72,425
Cellulose acetate, sheets, rods, tubes						
Production, lbs.	592,079	1,223,848	546,422	1,416,253	658,250	830,992
Shipments, lbs.	615,549	1,102,419	529,529	1,466,693	601,724	887,938
Methanol (Bureau of the Census)						
Production, crude, gals.	....	404,112	277,182	462,584	309,219	465,205
Production, synthetic, gals.	....	3,018,333	1,897,847	2,735,963	1,449,607	2,564,783
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds.	....	2,956,369	2,481,176	2,778,419	2,328,065	2,631,155
Heavy goods, ship., linear yds.	....	2,005,416	1,905,767	2,025,340	1,428,773	1,489,980
Pyroxylin spreads, lbs. *c*	....	5,481,218	4,815,305	5,981,611	4,815,305	4,316,537
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*	....	....	$10,164	....	$9,700	$12,300
Crude sulfur *d*	$1,273	$1,050	....	....	$513	$1,192
Coal-tar chemicals *d*	$1,021	$1,214	....	....	$624	$1,146
Industrial chemicals *d*	$1,940	$2,060	....	....	$2,079	$2,459
Imports						
Chemicals and related prod. *d*	....	....	$4,876	....	$4,800	$6,700
Coal-tar chemicals *d*	$1,623	$1,605	....	....	$1,555	$1,649
Industrial chemicals *d*	$1,732	$1,620	....	....	$1,378	$2,246
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 = 100)						
Chemicals and allied prod., including petroleum	118.9	136.6	116.9	138.2	111.1	136.8
Other than petroleum	114.0	134.2	110.3	134.1	103.7	134.9
Chemicals	120.9	152.2	121.0	157.3	114.5	153.9
Explosives	93.1	103.6	93.1	104.2	89.4	103.8
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 = 100)						
Chemicals and allied prod., including petroleum	112.9	130.6	108.1	126.0	105.0	124.3
Other than petroleum	110.9	130.5	104.8	124.6	101.0	123.5
Chemicals	112.4	139.9	110.9	139.7	107.8	139.5
Explosives	84.9	92.2	81.8	90.5	80.5	95.3
Stocks of chemicals, etc.**						
Finished	z	....	z	143	z	141
Raw material	z	....	z	81	z	73
Price index chemicals	81.0	....	81.4	87.0	81.7	89.9
Chem. and drugs	77.3	....	77.7	82.2	77.7	78.2
Fert. mat.	67.2	....	67.3	71.7	66.9	71.3

INDUSTRIAL TRENDS



Business: Activity in the business world advanced sharply in the first 3 weeks of the past month, registering notable gains. In the final week the pace tended to level off somewhat, nevertheless, the spirit of optimism is at the highest point in nearly 18 months and augurs well for the state of trade over the balance of '38 and into the beginning of next year. The *Times* Index of Business Activity at 87.7 on Oct. 22 was at the peak for '38 to date.

Steel: Production in the final week of October was at the highest level so far this year, although activity has not yet reached 60%. Heavy commitments were placed in the past few weeks and many observers now state that the peak of operations will not be reached until December.

Automotive: Producers have revised their November schedules upward and are expected to turn out 350,000 units as compared to 250,000 in October. Over the final quarter, current talk in the Detroit area names figures between 800,000 and 1,000,000. Retail sales are excellent and dealers' stocks almost in the depleted class. Consensus of opinion now is that '39 model year total will reach between 3,000,000 and 3,500,000, as compared with approximately 2,500,000 in the '38 year.

Retail Trade: Volume in October was rather disappointing, but in most quarters this was blamed almost entirely on the unseasonal summer weather. A spurt was reported in the closing week of the month.

Wholesale Trade: The slight hesitancy apparent in the retail field has had some repercussions in the wholesale division. Demand for Christmas goods is excellent.

State of Chemical Trade
Current Statistics (October 31, 1938)—p. 21

VOL. 43
Nov. '38

CHEMICAL INDUSTRIES

Statistical and Technical Data Section

NO. 6
Part 2

State of Chemical Trade

Current Statistics (October 31, 1938)—p. 22

Employment: June to September employment gains are placed at 640,000, the rise in the latter month alone totaling 400,000, according to the Dept. of Labor. Much of the gain has been made in the automobile industry.

Textiles: Expansion in operating schedules is reported from the rayon, silk, and wool groups, while cotton-spinning operations are holding at the advanced rate prevailing for the past few months. News of the early introduction of new synthetic fibres for hosiery-making was easily the feature of the month.

Glass: Current rate is at the highest point reached so far this year but is still well below the corresponding figure for last year.

Paper: Paper production, other than newsprint, is at just about the same level as it was in the like period a year ago.

Carloadings: The wide difference in totals between '37 and '38 is narrowing. Of course, business was dropping rapidly in the final quarter of '37 and is now advancing.

Commodity Prices: The first decline in most of the accepted wholesale price indices took place late in September. With some notable exceptions prices slumped somewhat in the last 30 days.

Electrical Output: Weekly figures are still below the corresponding totals in '38, but the reverse is expected shortly.

Chemicals: Consumption of chemicals has been expanding at an encouraging rate over the past few months and some notable gains were reported in the last 30 days. The contract season has opened and generally speaking contract prices on most items are being renewed without change. The one outstanding revision is that on carbon black. This product was, of course, subjected to severe competition in the last contract period, and it was generally expected in the trade that the producers would make an effort to place the item on a more profitable basis. Not all the prices for '39 are out as yet, and particularly is this true in the raw paint materials field. The general consensus of opinions is that tonnages will improve in November over October, that some seasonal let-down will occur in December, and that a quick pick-up will take place after the turn of the year. In other words there is a definite feeling that business will be good over the next 5 or 6 months. Beyond that very few executives will hazard a guess.

Outlook: Bullish news continues to predominate in the business picture. Sentiment is distinctly one of optimism. The almost universal belief is that the next 6 months will prove to be the most satisfactory in well over a year.

MONTHLY STATISTICS (cont'd)

FERTILIZER:	September 1938	September 1937	August 1938	August 1937	July 1938	July 1937
Exports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials ..	....	125,329	146,636	169,349	112,944	168,654
Ammonium sulfate	....	7,607	5,672	9,498	1,526	10,138
Total phosphate rock	....	82,682	102,919	127,555	85,759	126,240
Total potash fertilizers	....	10,239	8,443	6,251	4,739	15,009
Imports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials ..	....	158,753	77,452	129,877	57,773	90,686
Ammonium sulfate	....	4,752	9,374	7,146	9,961	11,068
Sodium nitrate	....	6,132	24,450	2,089	8,969	3,098
Total potash fertilizer	....	98,194	27,908	77,385	19,418	32,581
Superphosphate e (Nat. Fert. Association)						
Production, bulk	229,961	303,030	231,979	314,814	166,641	242,651
Shipments, total	334,084	385,943	146,963	172,361	131,557	169,264
Northern area	261,181	304,692	92,043	101,718	79,814	88,447
Southern area	72,903	81,251	54,920	70,643	51,743	80,817
Stocks, end of month, total ...	1,295,213	1,275,151	....	....	1,238,660	1,094,702
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	223,972	225,975	127,901	162,219	75,932	62,677
Total, 12 southern	137,337	135,018	44,005	40,245	59,232	52,776
Total, 5 midwest	86,635	90,957	83,896	121,974	16,700	9,901
Fertilizer payrolls	76.5	96.0	64.8	78.1	63.1	77.1
Fertilizer employment	81.9	93.9	68.7	81.3	64.0	69.8
Value imports, fert. and mat. *d*	$3,427	$3,311	....	....	$1,351	$2,002
GENERAL:						
Acceptances outst'd'g *f*	$261	$344	$258	$343	$265	$352
Coal prod., anthracite, tons ..	2,887,972	3,229,162	2,336,498	2,436,930	2,571,000	2,748,000
Coal prod., bituminous, tons ..	32,010,000	59,177,000	28,710,000	33,988,000	23,460,000	31,990.000
Com. paper outst'd'g *f*	$212	$331	$209	$329	$211	$325
Failures, Dun & Bradstreet	866	584	974	707	995	618
Factory payrolls *i*	80.7	104.4	76.4	103.8	67.5	100.4
Factory employment *i*	88.9	109.0	81.3	102.3	76.4	101.4
Merchandise imports *i*	$167,651	$233,142	$165,540	$245,668	$140,836	$265,214
Merchandise exports *i*	$246,361	$296,579	$230,621	$277,031	$227,780	$268,184
GENERAL MANUFACTURING:						
Automotive production	83,534	171,213	90,484	394,330	141,437	438,968
Boot and shoe prod., pairs ..	37,861,931	34,032,089	41,643,916	38,661,489	30,415,556	34,842,000
Bldg. contracts, Dodge *j*	$300,900	$207,072	$313,141	$281,217	$239,799	$321,603
Newsprint prod., U. S. tons ..	68,315	77,847	67,436	80,311	86,256	78,205
Newsprint prod., Canada, tons	231,940	312,220	220,303	318,713	202,546	316,194
Plate glass prod., sq. ft.	8,873,344	16,479,144	7,676,078	17,898,064	5,505,768	15,344,855
Steel ingot prod., tons	2,657,748	4,289,507	2,546,988	4,877,826	1,982,058	4,556,304
% steel capacity	46.28	76.30	42.85	83.33	33.42	78.48
Pig iron prod., tons	1,680,435	3,410,371	1,493,995	3,605,818	1,201,785	3,498,858
U. S. consumpt. crude rub., tons	37,823	43,893	38,170	41,456	32,209	43,650
Cotton consumpt., bales	....	....	....	....	449,511	583,011
Cotton spindles oper.	22,188,018	23,888,686	22,152,526	24,341,192	21,916,166	24,394,300
Silk deliveries, bales	38,844	36,372	38,504	....	32,593	31,399
Rayon ship., index *p*	874	562	895	693	843	697
Rayon employment *i*	315.1	380.1	293.9	376.7	270.5	401.0
Rayon payrolls *i*	308.0	369.1	289.0	375.8	249.5	392.9
Soap employment *i*	92.3	94.9	90.7	94.1	87.6	102.4
Soap payrolls *i*	94.4	97.5	91.2	94.0	87.1	116.9
Paper and pulp employment *i*	103.8	116.2	102.8	116.2	101.6	119.5
Paper and pulp payrolls *i* ...	101.2	115.8	101.9	122.0	96.9	119.2
Leather employment	78.2	90.5	77.0	91.8	73.9	94.7
Leather payrolls *i*	78.4	89.6	77.5	94.3	72.1	104.0
Glass employment *i*	79.7	110.9	78.7	109.4	74.7	107.9
Glass payrolls *i*	80.9	119.6	78.6	121.2	69.1	108.6
Rubber prod. employment *i* ...	75.6	97.5	72.5	97.3	68.7	96.2
Rubber prod. payrolls *i*	76.6	97.6	69.5	97.2	64.1	96.8
Dyeing and fin. employment *i*	103.8	110.6	101.8	109.6	97.0	109.1
Dyeing and fin. payrolls *i* ...	89.4	95.0	87.5	93.8	78.3	94.1
MISCELLANEOUS:						
Oils & Fats Index ('26 = 100)	59.5	74.5	60.6	78.8	63.9	84.6
Gasoline prod., bbls.	....	....	50,071	48,956	48,913	48,216
Cottonseed oil consumpt., bbls.	....	....	326,723	315,152	332,986	....
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments	....	$34,489,882	$30,182,013	$35,305,043	$27.946,084	$36,004,636
Trade sales (580 establishments)	....	$18,536,147	$17,224,845	$18,521,006	$16,368,159	$18,502,323
Industrial sales, total	....	$14,009,835	$9,894,867	$13,517,878	$8,806,128	$14,186,572

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100; *j* 000 omitted, 37 states; *p* Rayon Organon, 1923-25 = 100; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Temporarily not available.

Chemical Finances

October 1938—p. 21

Price Trend of Representative Chemical Company Stocks

	Sept. 30	Oct. 8	Oct. 17	Oct. 23	Oct. 29	Oct. 31	Net gain or loss last mo.	Price on Oct. 31, 1937	1938 High	1938 Low
Air Reduction ..	59½	67	67	64¼	63¾	63¾	+4¼	57¼	67¼	40
Allied Chemical	183	192	192	194	186	187	+4	163¾	197	124
Am. Cyan'd "B"	24½	26½	26½	27	26⅛	25⅞	+1⅜	26	27⅛	15½
Am. Agric. Chem	78k	28¼n	26½n	25n	24n	24n	—	66	28½	23⅞
Columbian Carbon	88	96	96¼	95½	94	—	+6	88	98½	53¾
Com'l Solvents ..	10	10⅞	10½	11⅛	10⅝	11	+1	9⅛	12¼	5⅞
Dow Chemical .	127	137	136	133	133¼	133	+6	98	140⅛	87⅞
du Pont	134½	142¼	148	135¾	135	146¾	+12¼	125¾	150¾	90½
Hercules Powder	62	66½	67	68	67¾	68½	+6½	132	69½	42¾
Mathieson Alkali	28	32¾	31¾	35	35	—	+7	26¼	36¾	19¾
Monsanto Chemical	95½	97½	101½	104	104½	105	+9½	88	105⅛	67
Std. of N. J. ...	53¼	53	52¾	53¼	51⅞	52	—1¼	—	58⅜	39¾
Tex. Gulf Sulph.	37⅜	33¼	34½	34¼	32½	31	—6⅜	32½	38	26
Union Carbide.	84¼	87	89½	89⅛	86	86⅜	+2⅛	80	90⅜	57
U. S. Ind. Alco.	21	26⅜	27¾	26¾	26¾	27	+6	18¾	29½	13½

Earnings Statements Summarized

Company:	Annual dividends	Net income 1938	Net income 1937	Common share earnings 1938	Common share earnings 1937	Surplus after dividends 1938	Surplus after dividends 1937
Air Reduction							
Sept. 30 quarter	y$1.50	$962,273	$1,990,995	$ .37	$ .77	......	......
‡‡Nine months, Sept. 30	y1.50	2,646,620	6,231,432	1.03	2.41	......	......
American Agricultural Chem.							
Sept. 29 quarter	....	†162,339	20,453	....	h.10	......	......
Atlas Powder							
Sept. 30 quarter	y2.75	278,085	396,488	.77	1.24	......	......
Twelve months, Sept. 30	y2.75	745,736	1,264,310	1.96	4.03	......	......
Barber Asphalt							
††September 30 quarter ..	y.75	101,456	226,855	.26	.58	......	......
Nine months, Sept. 30 ..	y.75	†168,653	629,649	....	1.61	......	......
Twelve months, Sept. 30	y.75	†54,406	855,589	....	2.19	......	......
Bon Ami Co.							
††Sept. 30 quarter	b§2.50	345,985	344,339	b.94	b.94	......	......
Nine months, Sept. 30 ..	b§2.50	1,025,020	1,023,337	b2.79	b2.80	......	......
Catalin Corp. of America							
Nine months, Sept. 30 ..	f....	‡36,985	‡149,900	....	....	......	......
Celanese Corp. of America							
Sept. 30 quarter	f....	1,325,098	1,025,208	.70	.43	......	......
Nine months, Sept. 30 ..	f....	1,865,423	4,469,314	.20	2.54	......	......
Twelve months, Sept. 30	f....	1,857,336	*........	4.75	....	......	......
Corn Products Refining							
††Sept. 30 quarter	3.00	2,066,488	661,154	.65	.09	......	......
Nine months, Sept. 30...	3.00	7,113,111	5,003,040	2.30	1.47	$130,487	d$1,979,584
Dow Chemical							
Aug. 31 quarter	y3.00	838,703	......	.81	....	......	......
E. I. du Pont de Nemours							
Sept. 30 quarter	y3.75	12,350,713	22,963,289	.95	1.92	1,863,495	4,102,705
Nine months, Sept. 30 ..	y3.75	31,288,318	62,799,523	2.31	5.33	5,349,131	10,292,975
Freeport Sulphur							
Sept. 30 quarter	2.00	393;505	699,518	.50	.85	......	......
Nine months, Sept. 30 ..	2.00	1,258,804	1,979,360	1.56	2.41	......	......
General Printing Ink							
††Sept. 30 quarter	y.60	175,370	269,625	.17	.30	......	......
Nine months, Sept. 30 ..	y.60	510,466	986,492	.48	1.13	......	......
Hercules Powder							
Sept. 30 quarter	y1.65	741,501	1,246,811	j.46	j1.87	......	......
Nine months, Sept. 30..	y1.65	1,968,635	4,283,823	j1.20	j6.57	......	......
Industrial Rayon Corp.							
Sept. 30 quarter	e.25	301,136	16,544	.40	.02	......	......
Nine months, Sept. 30 ..	e.25	180,686	197,916	.24	.26	......	......
Jones & Laughlin Steel							
Sept. 30 quarter	f....	†1,958,810	1,750,696	....	1.25	......	......
Nine months, Sept. 30...	f....	†4,882,838	6,185,066	....	5.38	......	......
MacAndrews & Forbes Co.							
Sept. 30 quarter	y2.50	175,896	218,908	.48	.62	d5,907	37,105
Nine months, Sept. 30 ..	y2.50	518,546	682,194	1.41	1.95	d26,863	136,785
Mathieson Alkali Works							
Sept. 30 quarter	y1.65	337,408	476.598	.36	.52	*.....	*.....
Nine months, Sept. 30 ..	y1.65	702,961	1,470,376	.70	1.62	*.....	*.....
North American Rayon							
Twelve weeks, Sept. 10...	f....	343,745	818,488	....	....	......	......
Thirty-six weeks, Sept. 10	f....	140,914	2,509,318	....	....	......	......
Paraffine Cos.							
Sept. 30 quarter	y2.50	336,403	641,569	.66	1.30	......	......
Penn Salt Mfg.							
Twelve months, Sept. 30	y6.25	963,055	1,700,084	6.42	11.33	......	......
Ruberoid							
Sept. 30 quarter	f....	345,773	331,043	.87	.83	......	......
Nine months, Sept. 30 ..	f....	351,052	805,470	.88	2.02	......	......
Shell Union Oil							
Sept. 30 quarter	y.85	3,534,056	7,503,291	.23	.54	......	......
Nine months, Sept. 30 ...	y.85	9,364,493	15,984,218	.61	1.11	......	......
Sherwin-Williams							
Year, Aug. 31	y2.00	2,228,361	6,034,955	2.42	8.41	......	......
Staley Mfg.							
Nine months, Sept. 30...	f....	477,900	†436,517	....	....	......	......
Texas Gulf Sulphur							
Sept. 30 quarter	§2.00	1,558,648	3,145,607	.40	.82	d361,352	1,225,607
Nine months, Sept. 30 ...	§2.00	5,273,778	9,023,055	1.37	2.35	d486,222	2,303,055
Twelve months, Sept. 30	§2.00	7,840,004	11,152,679	2.04	2.90	......	......
U. S. Gypsum Co.							
Sept. 30, quarter	§2.00	1,607,725	1,456,307	1.23	1.11	......	......
Nine months, Sept. 30 ...	§2.00	3,788,945	4,857,560	2.83	3.73	......	......
Union Carbide & Carbon							
Sept. 30 quarter	y2.40	5,451,980	10,013,034	.60	1.11	......	......
‡‡Nine months, Sept. 30	y2.40	13,383,038	30,465,886	1.48	3.38	......	......
Victor Chemical Works							
Sept. 30 quarter	y.85	219,250	200,117	.31	.29	......	......
Nine months, Sept. 30 ..	y.85	494,794	542,604	.71	.78	......	......

y Amount paid or payable in 12 months to and including the payable date of the most recent announcement; ‡‡ indicated earnings as compiled from company's quarterly reports; † net loss; *h* on shares outstanding at close of respective periods; *b* on class B shares; § plus extras; *f* no common dividend; * not available; *j* on average number of shares; *d* deficit.

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Amer. I.G., Cl. A	$2.00	Oct. 31	Nov. 7
Amer. I.G., Cl. B. ..	20c	Oct. 31	Nov. 7
Archer-Daniels-Mid. pfd., q.	$1.75	Oct. 21	Nov. 1
Atlantic Refining, q.	25c	Nov. 22	Dec. 15
Atlantic Refining pf. q.	$1.00	Oct. 4	Nov. 1
Atlas Powder, pfd., q.	$1.25	Oct. 21	Nov. 1
Can. Industries, A & B	$1.25	Sept. 30	Oct. 31
Colgate-Palm.-Peet	.12½c	Oct. 18	Nov. 15
Colgate-Palm.-Peet E	12½c	Oct. 18	Nov. 15
Cons. Chem. Indus. Cl. A, q.	37½c	Oct. 15	Nov. 1
Dow Chemical	75c	Nov. 1	Nov. 15
Dow Chemical pf., q.	$1.25	Nov. 1	Nov. 15
Freeport Sulphur q.	50c	Nov. 15	Dec. 1
Gt. Western Electro-Chem.	80c	Nov. 5	Nov. 15
Hercules Powder pf. q.	$1.50	Nov. 4	Nov. 15
Interchemical Corp. pf., q.	$1.50	Oct. 20	Nov, 1
Int'l Nickel of Canada pf., q.	$1.75	Oct. 4	Nov. 1
Monsanto Chem. pf., s.	$2.25	Nov. 10	Dec. 1
Nat'l Lead, Cl. B., pf., q.	$1.50	Oct. 14	Nov. 1
Nat'l Lead pfd., A, q.	$1.75	Dec. 2	Dec. 15
N. J. Zinc	50c	Nov. 19	Dec. 10
Procter & Gamble, q.	50c	Oct. 25	Nov. 15
Sherwin-Williams	50c	Oct. 31	Nov. 15
Sherwin-Williams pf., q.	$1.25	Nov. 15	Dec. 1
Skelly Oil	50c	Nov. 15	Dec. 15
Skelly Oil pfd., q.	$1.50	Oct. 4	Nov. 1
Solvay Amer Corp. pf., q.	$1.37½	Oct. 15	Nov. 15
Sun Oil, q.	25c	Nov. 25	Dec. 15
Sun Oil, pf., q. ...	$1.50	Nov. 10	Dec. 1
United Dyewood Corp., pfd., q.	$1.75	Dec. 9	Jan. 3
Westvaco Chlorine q.	25c	Nov. 10	Dec. 1
Westvaco Chlorine pf., q.	37½c	Oct. 11	Nov. 1

E extra; s semi-annual.

Hercules 9 Months' Net—$1,968,635

Hercules Powder reports for the first 9 months of '38 net earnings of $1,968,635, after providing for depreciation and Federal taxes. This is equal, after payment of preferred dividends, to $1.20 a share on an average of 1,316,710 shares of common stock outstanding during the period. Figures for the first 9 months of '37 showed net earnings of $4,283,823, equal, after payment of preferred dividends, to $6.57 a common share on an average of 592,527 shares then outstanding.

Current assets, as shown at the end of the third quarter, amount to $21,329,561. This represents an 11.7 ratio to current liabilities. Cash and marketable securities amount to $10,240,253. Dividends of 90c a share were paid on the common stock during the period.

Carbide Nets $5,451,980

Union Carbide and Carbon reports for the 3rd quarter, ending Sept. 30, net income of $5,451,980.31, equal to 60.42c a share on 9,023,138 shares. Third quarter earnings of 60.42c a share compare with 41.25c a share in the second quarter of '38 and 46.65c a share in the first quarter of '38.

Chemical Finances
October 1938—p. 21

Chemical Finances

October 1938—p. 22

Chemical Stocks and Bonds

Stocks

PRICE RANGE October 1938 Last	October 1938 High	October 1938 Low	1937 High	1937 Low	1936 High	1936 Low	Sales: Number of shares October 1938	Sales: 1938	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per-share-$ 1937	1936	1935
NEW YORK STOCK EXCHANGE															
56⅜	57½	36¼	55	36	...	...	5.400	26,100	Abbott Labs.	No	640,000	$2.10	2.51	2.21	1.77
63¾	67¼	40	80¼	44½	86½	58	33,000	303,100	Air Reduction	No	2,566,191	3.00	2.86	2.79	2.05
187	197	124	258½	145	345	157	14,600	145,200	Allied Chem. & Dye	No	2,214,099	7.50	11.19	11.44	8.71
24	28½	16⅜	33¾	17⅞	29⅝	16⅜	12,600	39,800	Amer. Agric. Chem	No	628,296	2.58	2.95	1.57	2.12
13½	14¾	9	30¾	8¼	35⅜	20½	27,000	109,300	Amer. Com. Alcohol	No	260,930	.50	3.23	4.55	3.16
28½	31½	20	46	22	50	37	3,300	20,400	Archer-Dan.-Midland	No	549,546	2.00	5.03	3.05	4.20
62½	63½	36	94	38	84	48	2,500	26,600	Atlas Powder Co.	No	248,145	2.25	4.40	4.21	2.81
120	121½	105	133	101	131	112	410	2,380	5% conv. cum. pfd.	100	68,597	5.00	20.90	20.85	16.93
25	25¾	9	41¼	13	32¼	21¾	92,900	647,500	Celanese Corp. Amer.	No	1,000,000	2.25	2.04	2.33	1.99
93	96	82	115	90	116	106	600	3,550	prior pfd.	100	164,818	7.00	27.07	27.25	35.34
15⅝	16⅛	7⅛	25¾	8½	21¼	13	108,900	429,900	Colgate-Palm.-Peet	No	1,999,970	.50	—.35	1.40	1.36
103	103	78	104½	95	106½	100	2,100	16,700	6% pfd.	100	248,197	6.00	3.21	17.13	16.79
94	98½	53¾	125¾	65	136½	94	3,800	45,200	Columbian Carbon	No	537,406	6.50	8.31	7.48	5.56
11	12¼	5⅞	21¼	5	24⅝	14¼	116,800	729,600	Commercial Solvents	No	2,636,878	.60	.60	.85	1.02
69½	70¾	53	71¼	50½	82½	63⅝	26,000	169,100	Corn Products	25	2,530,000	3.00	2.52	3.86	2.62
175	175½	162	171½	153	170	158	500	4,400	7% cum. pfd.	100	245,738	7.00	32.96	46.76	33.97
39¾	40⅞	25	76⅛	29½	63	42	3,920	22,540	Devoe & Rayn. A	No	95,000	3.25	4.05	4.49	2.89
133	140⅛	87⅞	159¼	79½	142¼	94⅛	9,400	68,500	Dow Chemical	No	945,000	3.35	4.17	4.48	3.29
146¾	150¾	90½	180⅛	98	184¾	133	58,200	683,900	DuPont de Nemours	20	11,041,437	6.25	7.37	7.54	5.04
119⅜	119⅝	109½	112	107½	...	...	2,300	14,100	4½% pfd.	No	500,000	4.50	165.48	......	......
135	137⅛	130¾	135½	130	136½	129	4,400	29,100	6% cum. deb.	100	1,092,948	6.00	81.70	84.21	56.81
181	184	121½	198	144	185	156	14,900	134,800	Eastman Kodak	No	2,250,921	7.50	9.76	8.23	6.90
170	171	157	164	150	166	152	650	2,600	6% cum.	100	61,657	6.00	362.45	306.64	258.09
27½	32	19⅞	32¼	18	35⅝	23½	44,800	224,700	Freeport Texas	10	796,380	1.50	3.30	2.43	1.78
9⅞	12⅛	6¾	19	8½	18	9½	12,300	104,800	Gen. Printing Ink	1	735,960	1.20	1.32	1.32	.97
24⅜	27¼	13	51½	19⅛	55¼	39½	28,500	174,500	Glidden Co.	No	799,701	2.60	2.62	3.29	2.74
48	51½	37	58⅛	43	56	52¼	1,100	6,500	4½% cum. pfd.	50	199,940	2.25	12.72	15.43	13.23
101½	102	76¾	117½	80⅛	133	99⅝	1,100	10,600	Hazel Atlas	25	434,474	6.56	6.67	6.55	7.58
68½	69½	42¾	92½	50	75	42	8,800	123,900	Hercules Powder	No	1,316,710	2.62	2.97	3.24	2.12
132½	135	126¾	135½	125	135	126	460	3,100	6% cum. pfd.	100	96,194	6.00	50.75	48.97	36.30
25½	30⅜	14⅜	47½	15	41⅜	25⅝	14,800	198,100	Industrial Rayon	No	759,325	2.00	.34	2.24	1.00
27½	27½	15	64¼	20	48	37	10,100	60,400	Interchem.	No	289,058	2.00	1.44	3.02	2.21
92	98	80	111½	92	112	107	11,800	13,810	6% pfd.	100	66,917	6.00	12.26	18.97	16.15
2¾	3⅞	2	9⅛	2	5⅞	2⅞	7,400	94,200	Intern. Agricul.	No	438,048	....	.16	—1.55	—.99
25½	29	15	63½	18¼	47¼	22¾	2,300	27,100	7% cum. pfd.	100	100,000	3.00	7.70	.23	2.69
56	57½	36⅞	73⅜	37	66⅜	43¼	245,700	3,133,700	Intern. Nickel	No	14,584,025	2.25	3.31	2.40	1.65
28½	28½	19	28¾	19½	30	23	3,500	14,700	Intern. Salt	No	240,000	1.75	2.17	1.70	1.32
22¼	24	19¾	36	19¼	36¾	29¼	1,700	10,500	Kellogg (Spencer)	No	500,000	1.60	2.81	2.62	2.22
56	58¼	23¼	79	33⅝	80¼	47¼	75,000	358,800	Libbey Owens Ford	No	2,506,117	4.00	4.19	4.14	3.26
18¼	21½	12⅛	26⅞	14	46½	32½	8,200	95,000	Liquid Carbonic	No	700,000	2.75	2.37	1.58	1.29
35	36¾	19¾	41¾	22	42⅜	27½	21,200	72,900	Mathieson Alkali	No	828,191	1.65	1.81	1.76	1.44
105	105⅛	67	107½	71	103	79	21,700	170,400	Monsanto Chem.	No	1,114,388	3.00	4.40	4.01	3.45
116¼	117½	111	109	105	...	...	390	12,120	4½% pfd.	No	50,000	4.50	99.98	......	......
27¼	31	17⅛	44	18	36½	26¾	124,300	545,500	National Lead	10	3,098,310	.50	.95	1.71	1.08
175	178½	154	171	153	171	155	500	3,800	7% cum. "A" pfd.	100	243,676	7.00	22.86	33.83	25.40
142	145½	127	150	127	147	137¾	180	2,650	6% cum. "B" pfd.	100	103,277	6.00	43.77	74.50	49.05
16¾	19½	9⅞	41¾	10⅛	40	9	74,000	748,000	Newport Industries	1	519,347	.50	2.22	.98	.57
70¾	76	40	103¾	51¼	82	64	33,600	265,400	Owens-Illinois Glass	12.50	2,661,204	4.00	3.51	3.80	2.09
57⅝	59	39½	65½	43¼	56	40¼	26,400	185,400	Procter & Gamble	No	6,325,087	2.75	4.08	2.39	2.23
117¾	122¼	115	118½	114½	122½	115¾	1,040	9,000	5% pfd.	100	169,517	5.00	157.05	94.14	88.15
15	18⅜	10	34¾	14⅞	28¼	14¾	29,600	214,800	Shell Union Oil	No	13,070,625	1.00	1.44	1.35	.37
105	106½	93	105⅜	91	127½	102	2,800	22,300	5½% cum. pfd.	100	379,798	5.00	60.59	57.20	17.92
24⅝	34¾	18½	60⅝	26½	47⅜	19½	23,500	162,900	Skelly Oil	No	1,006,348	1.50	6.07	4.42	2.17
96	96	84	102¼	88	132	97⅝	1,500	5,400	6% cum. pfd.	100	66,300	6.00	97.86	73.16	39.00
29⅛	35½	24¾	50	26½	48½	32¾	56,100	473,500	S. O. Indiana	25	15,235,323	2.30	3.06	3.09	1.98
52	58⅜	39¾	76	42	70⅜	51⅛	133,100	1,090,600	S. O. New Jersey	25	26,224,767	2.50	5.64	3.73	2.39
7¼	8	3⅞	15⅜	5¼	13	5⅝	17,000	148,500	Tenn. Corp.	5	853,696	.35	1.09	.41	.22
42¾	49⅝	32⅝	65⅛	34¾	55¼	28⅞	164,800	1,131,800	Texas Corp.	25	11,386,253	2.25	5.02	4.10	1.57
31	38	26	44	23¾	44¾	33	46,000	324,400	Texas Gulf Sulphur	No	3,840,000	2.75	3.02	2.57	1.94
86⅜	90⅜	57	111	61¼	105¼	71⅝	69,700	791,000	Union Carbide & Carbon.	No	9,000,743	3.20	4.75	4.09	3.06
67½	70¼	39	91	36¾	96¾	68	11,100	93,500	United Carbon	No	397,885	4.50	5.30	5.54	4.71
27	29½	13½	43⅝	16⅛	59	31¼	43,900	151,800	U. S. Indus. Alcohol	No	391,238	....	1.24	—.20	2.16
24¼	25¼	11[illegible]	39⅜	9¼	30⅝	16¼	71,300	312,200	Vanadium Corp. Amer.	No	376,637	1.00	2.22	.40	—1.13
17½	18½	13½	...	...	...	...	7,400	22,600	Victor Chem.	5	696,000	1.12	1.01	1.16	1.13
3⅞	5⅝	2¾	12¾	2⅜	8½	4⅛	11,400	157,400	Virginia-Caro. Chem.	No	486,708	....	—.05	—2.44	—.79
26	32⅛	15¾	74⅜	18½	58¾	28¾	7,800	126,10	6% cum. part. pfd.	100	213,392	1.50	5.88	.44	4.20
19	20⅛	10	27¼	10¾	32	19¾	3,800	27,900	Westvaco Chlorine	No	339,362	1.00	1.46	1.17	1.37
30¼	30¼	20	34⅞	21⅛	35¼	31¾	1,800	17,800	cum. pfd.	30	192,000	1.50	4.09	3.26	3.22
NEW YORK CURB EXCHANGE															
25⅞	27⅛	15½	37	17⅝	40¾	29¼	37,700	385,700	Amer. Cyanamid "B"	10	2,520,368	.60	2.09	1.77	1.61
86	86	50	124	69	116¼	99¼	650	4,700	Celanese, 7% cum. 1st pfd.	100	148,179	7.00	22.32	24.47	21.96
5½	6¾	3	15	3	16½	9	2,200	10,400	Celluloid Corp.	15	194,952	....	—.92	—.80	—.95
6⅝	12	6⅝	14⅝	10½	15	11⅞	200	1,300	Courtaulds' Ltd.	£1	24,000,000	9½%	8.64%	8.30%	7.51%
7¾	9⅞	6	10⅝	3½	10¾	5	1,800	16,500	Duval Texas Sulphur	No	500,000	....	.43	.61	.16
41	41	27	47½	31	55	39	1,000	5,400	Heyden Chem. Corp.	100	150,000	2.50	3.94	3.56	3.22
109¾	115½	55	147½	77	140	98¼	10,500	91,500	Pittsburgh Plate Glass	25	2,142,443	6.50	8.53	7.15	5.32
109	117¾	66	154¾	72¼	154½	117	5,750	62,650	Sherwin Williams	25	633,927	6.00	8.44	8.04	6.19
112½	114⅛	107	114	106¼	116	110	360	2,310	5% cum. pfd.	100	137,139	5.00	44.01	41.44	33.17
PHILADELPHIA STOCK EXCHANGE															
155½	160	121½	179	115	179	114¾	875	4,150	Pennsylvania Salt	50	150,000	8.75	11.79	8.57	5.94

Bonds

PRICE RANGE October 1938 Last	October 1938 High	October 1938 Low	1937 High	1937 Low	1936 High	1936 Low	Sales: October 1938	Sales: 1938	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
103¾	105⅜	99⅛	109½	99	117½	107¾	403,000	2,837,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$25,300,000
33	38	25¼	42½	23	42½	27½	137,000	1,664,000	Anglo Chilean Nitrate inc. deb	1967	4½-5	J	12,067,000
105⅛	106⅛	102⅜	102⅞	100⅛	...	...	17,000	489,000	Dow Chemical	1951	3	J-D	5,000.000
102½	102¾	100	102	98½	102¾	96¾	11,000	198,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M-N	5,633,000
.32⅜	35⅜	24¾	35⅜	21¼	39	21	278,000	1,823,000	Lautaro Nitrate n inc. deb.	1975	4	J-D	30,500,000
23	23	20½	25½	20½	35	23½	......	26,000	Ruhr Chem.	1948	6	A-D	1,500,000
104¼	105	96½	102	93	101¼	94¼	388,000	4,390,000	Shell Union Oil	1951	3½	M-S	58,800,000
104	104⅜	90¼	102¾	94	102⅞	96⅝	165,000	1,814,000	Skelly Oil	1951	4	J-J	9,000,000
103	103	95	105	93½	105	103	14,000	210,000	Tenn. Corp. deb. "B"	1944	6	M-S	1,600,000
106¼	107⅜	103½	105¾	100	106	101½	341,000	3,300,000	Texas Corp.	1951	3½	J-D	60,000,000
99	99½	77	111	81	98½	85¾	97,000	532,000	Vanadium Corp. conv.	1941	5	A-O	2,800,000

* Paid in 1937, including extras but excluding dividends paid in stock. ** For either fiscal or calendar years.

Coke Production in 1937

Final statistics of the coke industry in '37, based on complete returns received by the Bureau of Mines, are given in the various tables on this and succeeding pages. Compilations marked B.M. were made under the direction of H. L. Bennit, Coal Economics Division, and M. van Siclen, chief engineer. Generally speaking, the tables reproduced have been shortened and largely deal with the byproducts of the coking industry, rather than with the coke and coal aspects.

Byproduct coke production in '37 reflected the generally high rate of steel production maintained during the year except in the final 6 months when business conditions turned downward and which movement became highly accelerated in the last quarter. The output in '37 of 49,210,748 tons was nearly 11% greater than the 44,569,100 tons reported in '36. Production, of course, in the current year so far is well below that of the like period for '37. For the first 9 months production of byproduct coke has reached only 22,062,718 tons, as compared with 39,114,971 tons in the first 3 quarters of '37. Naturally the output of byproducts including coal-tar chemicals has been affected. Benzol production in the first 9 months of '38 has almost been halved, the figures being 48,841,000 gals. for '38 and 93,592,000 for '37.

One of the most striking facts to be noted from the '37 report is the tremendous increase in the output of naphthalene. Following the serious scarcity which prevailed in this country a few years back

Value of Byproducts and of Coke, Including Breeze, per Ton of Coke Produced in the U. S., 1915-'37
B. M.

Byproduct	1915	1920	1925	1930	1935	1936	1937
Ammonia and compounds	$0.70	$1.16	$0.69	$0.502	$0.310	$0.287	$0.326
Light oil and its derivatives (including naphthalene)	.52	.61	.54	.527	.435	.438	.435
Surplus gas sold or used	.61	1.05	1.54	1.754	1.832	1.589	1.483
Tar sold	.25	.21	.30	.344	.368	.344	.375
Miscellaneous products	.03	.01	..	.061	.032	.039	.066
	2.11	3.04	3.07	3,188	2.977	2.697	2.685
Tar used, not sold	[1]	.22	.29	.312	.170	.197	.213
Breeze produced	[2]	.14	.22	.208	.170	.163	.162
Total value of byproducts including those not sold	2.19	3.40	3.58	3.708	3.317	3.057	3.060
Value of coke produced	3.45	10.15	5.28	4.836	[3]5.063	[3]5.064	[3]5.026
Total value of coke and byproducts	5.64	13.55	8.86	8.544	8.380	8.121	8.086

[1] Included in tar sold; [2] Estimate included in total; [3] The average receipts per ton of coke sold during these years were $5.828 in '36 and $6.111 in '37.

Statistics, Coke Industry, '37
B. M.

		Byproduct	Total
Byproduct coke produced:			
At merchant plants:			
Quantity	net tons	13,076,539	13,076,539
Value		$84,334,632	$84,334,632
At furnace plants:			
Quantity	net tons	36,134,209	36,134,209
Value		$163,021,120	$163,021,120
Total:			
Quantity	net tons	49,210,748	....
Value		$247,355,752	....
Byproducts produced:			
Gas	M cu. ft.	757,628,942	757,628,942
Wasted	%	1.84	1.84
Burned in coking process	%	37.04	37.04
Surplus sold or used	%	61.12	61.12
Tar	gals.	603,053,288	603,053,288
Ammonium sulfate or equivalent	lbs.	1,506,431,251	1,506,431,251
Crude light oil	gals.	187,054,346	187,054,346
Yield of byproducts per ton of coal:			
Gas	M cu. ft.	10.89	10.89
Tar	gals.	8.67	8.67
Ammonium sulfate or equivalent	lbs.	21.84	21.84
Crude light oil	gals.	2.86	2.86
Value of byproducts sold:			
Gas (surplus)		$72,961,697	$72,961,697
Tar:			
Sold		$18,456,483	$18,456,483
Used by producer		$10,490,075	$10,490,075
Ammonium sulfate or equivalent		$16,048,325	$16,048,325
Crude light oil and derivatives		$20,215,404	$20,215,404
Other byproducts[1]		$4,442,929	$4,442,929
Total value of coke, breeze, and byproducts[2]		$397,925,273	$411,706,484

[1] Includes naphthalene and tar derivatives. [2] Includes value of tar used by the coke plants.

Crude Light Oil and Derivatives Produced and Sold at Coke-Oven Plants in the U. S. in '37, By States
B. M.

State	Number of active plants	Crude oil produced: Total (gals.)	Crude oil produced: Gals. per ton of coal coked	Crude oil produced: Refined on premises (gallons)	Total derived products obtained from refinery operations (gals.)	Total derived products sold[1] (gals.)	Value of derived products sold[1]
Ala.	7	16,536,053	2.81	15,262,617	13,424,517	12,875,046	$1,479,368
Col.	1	2,325,559	3.22	2,320,022	1,803,373	1,644,311	[2]
Ill.	5	9,925,300	2.56	5,115,126	4,233,636	4,166,055	495,684
Ind.	4	18,983,999	2.70	19,547,814	16,722,110	16,874,784	2,152,623
Md.	1	6,238,540	2.99	6,217,697	5,370,217	5,526,498	[2]
Mich.	3	7,201,206	2.50	4,875,833	4,414,562	803,441	[2]
N. Y.	7	15,761,103	2.56	26,042,804	22,166,551	22,727,293	3,387,363
Ohio	14	26,480,820	2.81	25,210,713	20,271,494	20,118,453	2,694,724
Penn.	10	61,353,947	3.26	59,657,052	52,684,412	51,454,445	5,992,680
Tenn.	1	299,718	2.31	301,893	221,814	219,054	27,998
Utah	1	1,058,706	4.01	1,054,733	810,883	798,328	[2]
W. Va.	4	8,503,995	3.31	8,543,251	7,359,042	6,975,646	998,765
Conn., Ky., Mass., Minn., Miss., N. J., and Wisc.	8	12,385,400	2.20	7,881,240	7,019,695	6,921,701	1,041,642
Undistributed	..	..	..	..	..	..	989,098
Grand total, '37	66	187,054,346	2.86	182,030,795	156,502,306	151,105,055	19,259,945
At merchant plants	25	34,488,753	2.35	30,879,561	26,911,840	27,091,829	4,052,719
At furnace plants	41	152,565,593	3.01	151,151,234	129,590,466	124,013,226	15,207,226
Grand total, '36	62	170,234,202	2.91	163,990,960	140,972,234	136,294,329	17,967,013
Change in '37, %	+6.5	+9.9	—1.7	+11.0	+11.0	+10.9	+7.2

[1] Excludes 11,113,150 gallons valued at $955,459 of crude oil sold as such. [2] Included under "Undistributed."

Coke Production Data, 1937, p. 2

Statistical Trends of the Coke Industry, 1915-1937
B. M.

	1915	1923	1933	1935	1936	1937
Coke produced:						
Beehive ... net tons	27,508,255	19,379,870	911,058	917,208	1,706,063	3,164,721
Byproduct ... " "	14,072,895	37,597,664	26,678,136	34,224,053	44,569,121	49,210,748
Total ... " "	41,581,150	56,977,534	27,589,194	35,141,261	46,275,184	52,375,469
% of total from byproduct ovens	33.8	66.0	96.7	97.4	96.3	94.0
Stocks of producers, end of year, all coke ... net tons	[1]	[2]1,221,737	2,865,260	2,829,384	1,732,066	2,595,287
Ovens:						
Beehive, in existence end of year	93,110	62,349	16,857	13,674	13,012	12,194
Byproduct, in existence end of year	6,268	11,156	13,053	12,860	12,849	12,718
Byproduct, under construction end of year	1,191	629	—	122	305	259
Yield of byproducts per ton of coal charged:						
Tar ... gals.	7.1	8.1	9.39	9.18	8.86	8.67
Ammonium sulfate or equivalent ... lbs.	20.1	21.2	22.18	22.59	22.14	21.84
Light oil ... gals.	1.5	2.7	2.79	2.98	2.91	2.86
Surplus gas sold or used ... M. cu. ft.	4.3	5.9	7.14	7.04	6.85	6.66
Average gross receipts of byproducts per ton of coke:						
Tar sold and used	$0.25	$0.51	$0.506	$0.538	$0.541	$0.588
Ammonia and its compounds	$0.70	$0.84	$0.269	$0.310	$0.287	$0.326
Light oil and its derivatives (including naphthalene)	$0.52	$0.51	$0.461	$0.435	$0.438	$0.435
Surplus gas sold or used	$0.61	$1.37	$2.099	$1.832	$1.589	$1.483
Total byproducts, including breeze	$2.19	$3.48	$3.549	$3.317	$3.057	$3.060

[1] No data; [2] Furnace and foundry coke only.

(1936), much larger facilities were added which have eliminated this condition entirely and the '37 total of 115,979,238 lbs. of crude and refined contrasts very strongly with the 4,632,266 lbs. in '32 and the 10,743,471 lbs. in '34. Thus, ample supplies have been assured for the growth and expansion of phthalic anhydride production and, in turn, of the synthetic coatings. The shortage of naphthalene in '36 with its sharp rise in price was largely caused by an embargo on the crude by the German government. The purpose of the embargo was to conserve material for the manufacture of carbon black and a substitute for linseed oil. Little has been heard of these developments and over the past 18 months increasing amounts of foreign crude naphthalene have been offered.

Av. Yield of Coke and Byproducts Per Net Ton of Coal Charged in Byproduct Ovens in the U. S., 1936-'37
B. M.

Product	Unit	1936	1937
Coke	lbs.	1,409	1,414
Tar	gals.	8.86	8.67
Ammonium sulfate or equivalent	lbs.	[1]22.14	[1]21.84
Light oil	gals.	[1] 2.91	[1] 2.86
Gas:			
Total	M cu. ft.	11.06	10.89
Surplus sold or used	"	6.85	6.66
Firing ovens	"	4.02	4.03
Wasted	"	.19	.20

[1] Average for plants recovering this commodity.

Byproducts Obtained from Coke-Oven Operations in the U. S., '37[1]
(Exclusive of screenings or breeze)
B. M.

Product	Unit	Production	Sales Quantity	Sales Value Total	Sales Value Aver.
Tar	gals.	603,053,288	386,648,478	$18,456,483	$0.048
Ammonia:					
Sulfate	lbs.	1,289,740,739	1,332,308,748	14,477,234	.011
Ammonia liquor (NH_3 content)	"	54,172,628	52,394,717	1,571,091	.030
		....	....	16,048,325	....
Sulfate equivalent of all forms	"	1,506,431,251	1,541,887,616	....	.
Gas:					
Used under boilers, etc.	M cu. ft.	......	32,776,758	1,969,693	.060
Used in steel or affiliated plants	"	......	251,571,649	25,419,223	.101
Distributed through city mains	"	[2]757,628,942	150,936,668	42,657,825	.283
Sold for industrial use	"	......	27,757,884	2,914,956	.105
		......	463,042,959	72,961,697	.158
Light oil and derivatives:					
Crude light oil	gals.	[3]187,054,346	11,113,150	955,459	.086
Benzol, crude and refined	"	21,660,522	22,140,936	2,928,471	.132
Motor benzol	"	95,526,695	93,767,208	8,384,863	.089
Toluol, crude and refined	"	20,896,724	20,173,723	5,350,087	.265
Solvent naphtha	"	5,725,918	5,255,014	988,411	.188
Xylol	"	4,562,344	4,245,316	1,176,723	.277
Other light oil products,	"	8,130,103	5,522,858	431,390	.078
		[4]156,502,306	162,218,205	20,215,404	.125
Naphthalene, crude and refined	lbs.	60,797,108	60,315,581	1,182,992	.020
Tar derivatives:					
Creosote oil, distillate as such	gals.	15,401,597	14,900,402	1,452,879	.098
Creosote oil in coal-tar solution	"	1,908,550	1,048,044	89,223	.085
Pitch of tar	net tons	236,312	4,314	36,848	8.541
Other tar derivatives		....	....	1,310,612	....
Phenol	gals.	104,738	110,181	43,272	.393
Sodium phenolate	"	154,112	147,545	11,605	.079
Other products[5]		....	....	315,498	....
Value of all byproducts sold		....	....	[6]132,124,838	....

[1] Includes products of tar distillation conducted by coke-oven operators under same corporate name, except, however, phenol and other tar acids produced at Clairton, Pa.; [2] Includes gas wasted and gas used for heating retorts; [3] Refined on the premises to make the derived products shown, 182,030,795 gals. [4] Total gals. of derived products; [5] Ammonia thiocyanate, asphalt paint, carbolates, crude ferro cyanide, cyanogen sludge, extide covering, insecticides, light carbolic oils, pyridine oil, sodium carbolate, sodium prussiate, spent soda solution, sulfur brimstone, and vented vapors; [6] Exclusive of the value of breeze production, which in '37 amounted to $7,954,608.

Av. Receipts Per Unit of Coke-Oven Byproducts Sold, 1913-'37
B. M.

Year	Tar Gal. c	Sulfate Lb. c	Surplus gas M cu. ft. c	Benzol refined Gal. c	Motor benzol Gal. c	Toluol refined Gal.	Solvent naphtha[1] Gal. c	Naphthalene crude Lb.	Naphthalene refined Lb. c
1913	2.5	3.1	8.8	[2]27.0	[3]	[2]$0.29	[2]25.0		[3]
1915	2.6	2.8	10.2	56.8	[4]	2.45	24.0	[5]	10.0
1920	3.7	4.3	14.0	26.0	22.7	.300	18.1	2.7	6.1
1925	4.9	2.3	17.0	22.4	16.6	.261	20.2	1.0	2.5
1930	4.9	1.6	17.9	[5]17.6	14.1	[5] .299	20.5	[5]	1.2
1935	4.1	.09	18.2	[5]12.4	8.9	[5] .275	20.0	[5]	1.3
1936	4.3	1.0	16.3	[5]14.0	9.0	[5] .274	22.2	[5]	1.6
1937	4.8	1.0	15.8	[5]13.2	8.9	[5] .265	22.8	[5]	2.0

[1] Includes xylol. [2] Trade quotations, New York Market; used to avoid disclosing individual operators' reports. [3] No data. [4] Not reported during the war. [5] Crude and refined not separated.

Coke Production Data, 1937, p. 3

Byproduct Coke Produced, U. S., '37 By Months

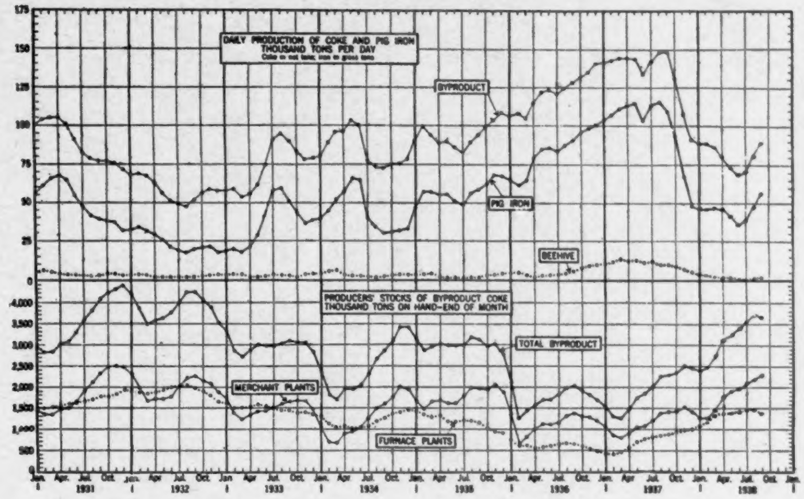
B. M.

Month	Furnace plants	Other plants	Total byproduct
Monthly production:			
Jan.	3,241,600	1,119,100	4,360,700
Feb.	2,996,500	996,400	3,992,900
Mar.	3,355,000	1,140,500	4,495,500
Apr.	3,310,300	1,040,600	4,350,900
May	3,375,600	1,104,100	4,479,700
June	2,917,500	1,107,300	4,024,800
July	3,316,100	1,107,800	4,423,900
Aug.	3,469,300	1,104,100	4,573,400
Sept.	3,334,700	1,093,100	4,427,800
Oct.	2,910,500	1,124,600	4,035,100
Nov.	2,142,700	1,079,600	3,222,300
Dec.	1,764,400	1,059,400	2,823,800
Tot.	36,134,200	13,076,600	49,210,800
Average daily production:			
Jan.	104,568	36,100	140,668
Feb.	107,018	35,586	142,604
Mar.	108,226	36,790	145,016
Apr.	110,343	34,687	145,030
May	108,890	35,616	144,506
June	97,250	36,910	134,160
July	106,971	35,735	142,706
Aug.	111,913	35,616	147,529
Sept.	111,156	36,437	147,593
Oct.	93,887	36,278	130,165
Nov.	71,423	35,987	107,410
Dec.	56,916	34,174	91,090
Av.	98,998	35,826	134,824

Price Comparison of Important Coal-Tar Chemicals Jan. 1, '37-Jan. 1, '38

	Jan. 1, '37	Jan. 1, '38
Acid Cresylic, high boil	$0.72	$0.89
low boil	.77	.92
Benzol, tanks	.16	.16
Cresol, U. S. P.	.10	.12½
Creosote oil, Grade 1, tanks	.13	.13½
Grade 2, tanks	.113	.122
Naphthalene, crude, dom.	2.75	2.60
Naphthalene, ref'd, balls, flakes	.07¼	.07¼
Orthodichlorbenzene	.05	.06
Paradichlorbenzene	.16	.11
Phenol, drs.	.13¼	.14½
Solvent naphtha, tanks	.31	.31
Tar acid oil 15%	.21	.22½
25%	.24½	.26½
Toluol, tanks	.30	.30
Xylol, tanks	.30	.30

PRODUCTION AND STOCKS OF COKE



Coal-tar chemical prices during '37 were decidedly firm with but very few exceptions. The exceptionally firm position of crude naphthalene at the opening of the year, however, failed to last very long. The major reasons for this have been commented on previously. The price of domestic material opened the year at $2.75 per 100 lbs., went to $2.85 very shortly. In February a 5c reduction was announced and a month later a 15c reduction followed. From then on larger quantities of both domestic and imported became available and the market definitely changed from a sellers' to a buyers' one.

The year '37 saw a very firm market in cresylic acid and prices for both domestic and imported rose rapidly when it became apparent that stocks were inadequate. At one period in the first quarter stocks were almost unobtainable on spot. A combination of circumstances contributed to this situation, the most important being the cessation by Germany of the export of over a million pounds annually. Additional factors were in the widening use in industry, particularly in the resin field, and the threat of the possibility that England would also place an embargo on exports in order to conserve supplies. In April the condition reached the acute stage and an 11c advance was announced for the low-boiling grade, bringing the market to 90c. At the same time the resin grade was increased 1¼c to the basis of 10¾c. A month later high-boiling was advanced from 83c to 89c, low-boiling from 90c to 92c, while the quotations for resin-grade were quoted as being nominal. These were the high points for the year.

In June the price changes in the coal-tar chemical group included an increase

Ammonia Produced and Sold from Coke-Oven Plants in '37, by States, in Lbs.

B. M.

State	Number of active plants	Sulfate equivalent of all forms: Total	Sulfate equivalent of all forms: Per ton of coal coked	Produced as— Sulfate	Produced as— Liquor (NH_3 content)	Sold as— Sulfate: Quantity	Sold as— Sulfate: Value	Sold as— Liquor (NH_3 content): Quantity	Sold as— Liquor (NH_3 content): Value
Ala.	7	144,118,327	24.48	125,122,491	4,748,959	113,653,896	$1,444,208	4,784,357	$162,191
Colo.	1	16,955,200	23.46	16,955,200	....	18,122,919	[1]	....	....
Ill.	7	87,201,369	21.03	64,608,729	5,648,160	64,060,092	643,549	5,730,533	[1]
Ind.	6	143,042,231	18.85	125,946,503	4,273,932	116,869,983	1,240,291	4,169,886	104,331
Md.	1	43,949,685	21.08	43,949,685	...	42,177,338	[1]	....	....
Mass.	2	37,725,092	23.35	34,976,300	687,198	39,356,420	[1]	678,941	[1]
Mich.	8	66,067,708	20.56	30,916,008	8,787,925	29,651,214	383,227	8,269,123	228,120
Minn.	3	16,582,715	16.54	16,582,715	...	16,273,677	173,639	....	....
N. J.	2	28,224,885	19.68	28,224,885	....	28,648,344	[1]	....	....
N. Y.	8	150,853,252	21.88	121,982,080	7,217,793	131,875,257	1,479,412	7,254,510	228,053
Ohio	14	200,595,930	21.32	161,006,658	9,897,318	168,387,179	1,780,207	9,365,816	295,474
Penn.	12	459,539,764	23.08	440,520,824	4,754,735	479,838,829	4,980,271	4,240,291	143,464
Tenn.	1	2,902,694	22.39	2,902,694	...	2,013,000	26,572	....	....
Utah	1	7,081,508	26.82	7,081,508	...	7,769,855	[1]	....	....
W. Va.	3	48,989,973	23.07	48,989,973	....	54,501,171	587,129	....	....
Conn., Ky., Miss., R. I., and Wisc.	5	52,600,918	20.68	19,974,486	8,156,608	19,109,574	229,484	7,901,260	200,278
Undistributed	..	....	....	....	....	....	1,509,245	....	209,180
Grand total, '37	81	1,506,431,251	21.84	1,289,740,739	54,172,628	1,332,308,748	14,477,234	52,394,717	1,571,091
At merchant plants	38	383,408,295	21.79	223,446,603	39,990,423	230,626,834	2,608,117	39,278,125	1,177,106
At furnace plants	43	1,123,022,956	21.86	1,066,294,136	14,182,205	1,101,681,914	11,869,117	13,116,592	393,985
Grand total, '36	81	1,388,682,583	22.14	1,199,645,603	47,259,245	1,123,343,067	11,484,191	46,907,237	1,328,788
Change in '37, %	0.0	+8.5	—1.4	+7.5	+14.6	+18.6	+26.1	+11.7	+18.2

[1] Included under "Undistributed."

Coke Production Data, 1937, p. 3

Coke Production Data, 1937, p. 4

of ½c for creosote oil, a 1c advance in shingle stain oil, a 25c per barrel rise in crude coal-tar, a 1½c advance in 15% tar acid oil, and a 2c rise in the 25% grade. By June steel operations had begun to drop very sharply with the resultant decline in coking operations. This led to serious shortages of the coal-tar solvents, including, of course, benzol, solvent naphtha, xylol, and toluol.

It was quite noticeable that the heavy demand for at least certain members of the coal-tar group held up for several months longer than the call for chemicals in the other groups. To a very large extent this was due to an unusually heavy demand for export. While business activity in the U. S. showed definite signs of contraction in the latter part of the 2nd quarter the export trade in coal-tar chemicals was sufficiently large to keep surpluses from accumulating. By July the slump in the automotive field became quite pronounced and the shortage of toluol and xylol ceased, but benzol continued scarce. That the export trade did have a very definite influence in the coal-tar chemical picture is evidenced by the fact that the total for the first 6 months of '37 amounted to $8,013,000 as against $7,425,000 in the like period of '36. In the same periods imports showed a gain of 33%. The gain in exports was caused by larger exports of finished materials, for exports of crude declined somewhat during the first 6 months, due to smaller shipments of crude coal-tar, pitch and certain other crudes.

Even as late as September a better demand was in evidence for coal-tar chemicals than was reported for other chemical groups. A long expected rise in phenol was announced, the increase of ¾c bringing the price level up to 13½c in tanks and 14½c for drums in carload lots. Much of the increased demand came from the plastics and resin field.

Like cresylic, a very serious shortage of phthalic anhydride was a feature of the coal-tar chemical market for the first half of the year. At times spot deliveries were unobtainable and producers were forced in many instances to ration deliveries. Prices, however, were not advanced. In the last few months of the year the slump in business activity changed this situation. Also, at least one of the important producers announced plans for materially increasing production facilities.

By November and December the sharp decline in general manufacturing activity reduced quite radically the domestic consumption of coal-tar chemicals. This was particularly true of the coal-tar solvents, intermediates and dyestuffs. At the same time much of the export market was lost when foreign customers, particularly in Japan, suddenly stopped purchasing.

Production of Byproducts at Byproduct Coke Plants owned by City Gas Companies (Public Utilities) and Included by Bureau of Census in Manufactured-Gas Industry, and at all other Byproduct Coke Plants, '37

B. M.

Product		Plants not owned by city gas companies	Plants owned by city gas companies (public utilities)	Total
Number of active plants		65	20	85
Coke:				
Production	net tons	45,699,231	3,511,517	49,210,748
Value		$223,873,967	$23,481,785	$247,355,752
Average value		$4.90	$6.69	$5.03
Tar:				
Production	gals.	555,607,964	47,445,324	603,053,288
Sales:				
Quantity	gals.	341,254,792	45,393,686	386,648,478
Value		$16,397,396	$2,059,087	$18,456,483
Average value		$0.048	$0.045	$0.048
Ammonia:				
Production (NH_3 equivalent of all forms)	lbs.	350,803,763	25,804,050	376,607,813
Liquor (NH_3 content):				
Production	lbs.	49,717,008	4,455,620	54,172,628
Sales	lbs.	47,970,372	4,424,345	52,394,717
Value		$1,482,593	$88,498	$1,571,091
Sulfate:				
Production	lbs.	1,204,347,020	85,393,719	1,289,740,739
Sales	lbs.	1,246,437,212	85,871,536	1,332,308,748
Value		$13,533,822	$943,412	$14,477,234
Crude light oil:				
Production	gals.	183,223,825	3,830,521	187,054,346
Sales	gals.	8,322,515	2,790,635	11,113,150
Value		$707,807	$247,652	$955,459
Light oil derivatives:				
Production	gals.	155,610,298	892,008	156,502,306
Sales	gals.	150,225,547	879,508	151,105,055
Value		$19,128,211	$131,734	$19,259,945
Naphthalene, crude and refined:				
Production	lbs.	59,863,754	933,354	60,797,108
Sales	lbs.	59,384,227	931,354	60,315,581
Value		$1,167,536	$15,456	$1,182,992
All other products, value		$3,126,280	$133,657	$3,259,937

Production and Sales of Coal-Tar Crudes at Byproduct Coke Plants and Tar Refineries, 1937[1]

B. M.

		Quantity	Value
Tar distilled[2]	Oil-gas tar	13,033,678 gals.	$ 680,465
	Water-gas tar	17,441,254 gals.	822,434
	Coal-tar	304,959,372 gals.	16,737,898
	Total	335,434,304 gals.	18,240,797

(In addition, 88,588,133 gals. of crude tar were refined at plant by the coke operators, products of which are included below.)

	Unit of quantity	Production quantity	Sales Quantity	Sales Value	Unit value
Tar[3]	gal.	603,053,288	386,648,478	$18,456,483	$0.048
Light oil derivatives:					
Crude light oil	"	187,103,087	11,153,337	962,836	.086
Benzol (except motor benzol)	"	26,795,497	[3]22,140,936	[3]2,928,471	.132
Motor benzol[3]	"	95,526,695	93,767,208	8,384,863	.089
Toluol, crude and refined[3]	"	20,896,724	20,173,723	5,350,087	.265
Solvent naphtha	"	7,077,114	6,343,220	1,295,500	.204
Xylol[3]	"	4,562,344	4,245,316	1,176,723	.277
Other light oil products[4]	"	12,842,115	11,806,798	1,871,115	.158
Naphthalene, crude and refined[5]	lb.	115,979,238	109,394,319	2,534,526	.023
Creosote oil	gal.	107,293,751	107,485,199	12,472,500	.116
Tars, crude and refined[2]	"	23,756,212	23,144,241	1,711,437	.074
Tars, road[2]	"	155,088,720	155,745,590	12,907,947	.083
Other distillates[6]	"	34,550,805	8,313,627	1,406,736	.169
Pitch of tar	ton	893,715	315,443	4,382,466	13.893
Pitch of tar coke[2]	"	181,495	91,983	1,131,812	12.305

[1] Data for coke ovens reported to Bureau of Mines, and for tar refineries and others reporting to the Tariff Commission, unless otherwise noted; [2] Reported to the Tariff Commission only; [3] Reported to the Bureau of Mines only; [4] Includes motor benzol, toluol, xylol and sales of benzol reported to the Tariff Commission and other light oil products reported to the Bureau of Mines; [5] Includes crude and refined naphthalene reported to the Bureau of Mines and crude naphthalene reported to the Tariff Commission; [6] Includes crude tar acids reported to the Tariff Commission and the Bureau of Mines, and phenol and sodium phenolate reported to the Bureau of Mines.

U. S. Chemical Patents

Off. Gaz.—Vol. 493, Nos. 4, 5—Vol. 494, Nos. 1, 2, 3, 4—p. 55

Agricultural Chemicals

Production magnesia and nitrogenous fertilizers from dolomite. No. 2,130,240. Otto Kippe, Osnabruck, Germany, to Klockner-Werke A.-G., Castrop-Rauxel, Germany.

Cellulose

Production hydrolyzed cellulose acetate. No. 2,129,052. Charles R. Fordyce, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Saponification organic esters of cellulose. No. 2,129,995. Henry Dreyfus, London, England.

Preparation alkyl ethers of cellulose. No. 2,130,998. Eugene J. Lorand to Hercules Powder Co., both of Wilmington, Del.

Chemical Specialty

Process waterproofing material with an aqueous emulsion of a hydrocarbon waterproofing agent; pre-treating material with solution of an emulsion stabilizer, then mixing material with a quick-breaking aqueous emulsion of a waterproofing agent free of colloidal powders. No. 2,128,-464. Lester Kirschbraun, Leonia, N. J., to Patent and Licensing Corp., New York City.

Preparation of a size; mixing sodium rosin, solid alkali and a solution of alkali, there being insufficient water to give a liquid product in which the total alkali used is sufficient to saponify the rosin, the dry alkali constituting from 10 to 50% of the total. No. 2,128,482. William Harry Harding, Rockville Centre, N. Y., to American Cyanamid & Chemical Corp., New York City.

Printing ink for printing presses, having rollers of the glue, glycerine and water type, which is non-drying on the press at ordinary temperatures. No. 2,128,672. Albert E. Gessler, Yonkers, N. Y., to Interchemical Corp., Cincinnati, Ohio.

Manufacture drier for paints, varnishes, etc., comprising a castor oil metal compound. No. 2,128,732. Remmet Priester, Deventer, Netherlands, to Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury & Van Der Lande, Deventer, Netherlands.

Method of flocking; first applying adhesive to material. No. 2,128,811. Fred L. Foster to Ranap Co., both of Lynn, Mass.

Production composition cork; mixing comminuted cork with a resinous binder. No. 2,128,880. Kenneth M. Irey and Lawrence M. Debing, Palisades Park, N. J., to Resinox Corp., New York City.

Production asphalt in solvent refinement of petroleum substances. No. 2,128,885. John Ward Poole, Jaffrey, N. H.

Preparation a morpholine ethanol ethyl ether; hydrogenating a morpholine ethanol vinyl ether in vapor phase in presence of a catalyst. No. 2,128,-887. Alexander L. Wilson, Pittsburgh, Pa., to Union Carbide & Carbon Corp., corp. of New York.

Resilient cork composition; mixing comminuted cork with a partially reacted thermo-setting synthetic resin and a compatible cork softening agent. No. 2,128,894. Samuel C. Bond, Holly Oak, Del., to Bond Manufacturing Corp., corp. of Del.

Manufacture coated abrasive product. No. 2,128,905. Raymond C. Benner and Romie L. Melton, to Carborundum Co., all of Niagara Falls, N. Y.

Manufacture flexible abrasive coated webs. No. 2,128,906. Raymond C. Benner and Romie L. Melton, to Carborundum Co., all of Niagara Falls, New York.

Method fabricating abrasive coated web material. No. 2,128,907. Raymond C. Benner and Romie L. Melton to Carborundum Co., all of Niagara, Falls, N. Y.

Composition for preservation rubber. No. 2,128,944. Webster N. Jones, Pittsburgh, Pa., to B. F. Goodrich Co., New York City.

Composition for preservation rubber. No. 2,128,945. Webster N. Jones, Pittsburgh, Pa., to B. F. Goodrich Co., New York City.

Manufacture leatherboard; subjecting leatherboard containing iron-tannate inks to action of solution containing a phosphoric acid. No. 2,128,965. Herman W. Richter to George O. Jenkins Co., both of Bridgewater, Mass.

Manufacture coated abrasive products. No. 2,128,966. Norman Pierce Robie to Carborundum Co., both of Niagara Falls, N. Y.

Preparation insecticide containing a halogenated ketal. No. 2,129,025. Alfred Rieche, Wolfen, Kreis Bitterfeld, and Hans Maier-Bode and Wolfgang Eckardt, Dessau in Anhalt, Germany, to Winthrop Chemical Co., N. Y. City.

Roofing element comprising a plate-like body of hardened plastic material. No. 2,129,030. Thomas Robinson, Smithtown, N. Y., to Lancaster Processes, Inc., N. Y. City.

Adhesive: aqueous dispersion of rubber containing a water-soluble imide of an acid selected from the class of succinic-, phthalic-, and sulfobenzoic acids. No. 2,129,126. Warren E. Glancy, Watham, Mass., to Hood Rubber Co., Watertown, Mass.

Preservation rubber by treating same with a compound consisting of two dihydrocarbon substituted amino groups attached to a single aromatic hydrocarbon nucleus. No. 2,129,135. Webster N. Jones, Pittsburgh, Pa., to B. F. Goodrich Co., N. Y. City.

Use of a chlorinated naphtha-nitril as a dielectric and insulating medium in preparation of insulating materials and condensers. No. 2,129,146. Wilhelm Lommel, Leverkusen-Wiesdorf, and Rudolph Engelhardt, Leverkusen-I. G. Werk, Germany, to I. G., Frankfort-on-Main, Germany.

Oil cracking tube lining, including graphite particles and a binder, being adapted to be sheared to remove a carbon layer deposited thereon. No. 2,129,174. William T. Hancock, Long Beach, Calif.

Plant propagating paper pot impregnated with copper resinate. No. 2,129,190. Martin Leatherman, Hyattsville, Md., dedicated to free use of People of the U. S.

Product for stimulating plant growth, comprising a carbonaceous substance and a natural colloidal phosphate fertilizer, and added compounds of other chemicals. No. 2,129,334. Charles Northen, Orlando, Fla.

Manufacture safety paper. Nos. 2,129,362-3. Francis L. Simons, Needham, and Mark W. Weiss, Boston, Mass., to George La Monte & Son, Nutley, N. J.

Manufacture sheet suitable for wrapping purposes, having a coating thereon, and characterized by being heat sealing, transparent, and highly resistant to moisture vapor. No. 2,129,370. Erich Gebauer-Fuelnegg, deceased, late of Evanston, Ill., by Marie Gebauer-Fuelnegg, administratrix, Evanston, Ill., and Eugene W. Moffett, Chicago, Ill., to Marbon Corp., Chicago, Ill.

Polishing compound; abrasive composition composed of siliceous earth, aluminum oxide, tripoli powder, petroleum jelly, ceresine wax, stearic acid, Montan wax, tar, and cotton waste. No. 2,129,377. Hyman Libovitz, Newark, and Walter Mueller, Union, N. J., and William Pfeiffer, Jackson Heights, N. Y., to Allegro Co., corp. of N. J.

Conditioning yarn to render it more amenable to textile operations, applying thereto a lubricating and softening composition containing beta-methoxy ethyl succinate. No. 2,129,414. Wendell G. Faw, Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y.

Aqueous bituminous emulsion. No. 2,129,416. Benjamin Foster and Carl J. Seydel to Benjamin Foster Co., all of Phila., Pa.

Compound for lubricating wire rope; amber colored lubricant comprising a quick setting adhesive mixture including petroleum oil, stearic acid soap, rosin, and rubber cement. No. 2,129,422. James F. Hall to Ironsides Co., both of Columbus, Ohio.

Leak-sealing and rust-preventing composition for liquid leaks in heated metallic conduits and for inhibiting rust formation; mixture of a glutinous or gelatinous-forming material and a water-soluble chrome salt. No. 2,129,459. Constant A. Benoit, to Permatex Co., both of Brooklyn, N. Y.

Adhesive for plant spray materials, which is non-injurious to plant foliage, comprising a substance remaining in the fractionating column after the removal of solvent and pine oil in the steam and solvent process for production of naval stores products from pine wood. No. 2,129,517 Lyle D. Goodhue, Berwyn, Md., dedicated to free use of People of U. S

Treatment rubber; incorporating therein as an accelerator a condensation product of crotonaldehyde, a primary amine and an alkylene polyamine. No. 2,129,525. Alfred M. Clifford, Stow, Ohio, to Wingfoot Corp., Wilmington, Del.

Synthetic tanning material; prepared by co-condensing a dihydroxy diaryl sulfone sulfonate and urea with formaldehyde. No. 2,129,553. Alfred Russell and John W. Copenhaver, to Rohm & Haas Co., all of Phila., Pa.

Preparation synthetic tanning material; co-condensing a dihydroxy diaryl sulfone and urea with formaldehyde in strong acid solution, and dispersing resinous material obtained in an aqueous solution of an aromatic sulfonic acid. No. 2,129,554. Alfred Russell and John W. Copenhaver, to Rohm & Haas Co., all of Phila., Pa.

Propagation plants from cuttings, etc., inducing root growth by immersing basal end of cutting in an aqueous solution. No. 2,129,598. Percy W. Zimmerman and Albert E. Hitchcock to Boyce Thompson Institute for Plant Research, all of Yonkers, N. Y.

Propagation plants from cuttings, etc.; inducing root growth by subjecting cutting to action of an indole substitution product of a compound having butyric acid structure as its nucleus. No. 2,129,599. Percy W. Zimmerman and Albert E. Hitchcock to Boyce Thompson Institute for Plant Research, all of Yonkers, N. Y.

Propagation plants from cuttings, etc., inducing root growth by subjecting cutting to action of a naphthalene substitution product of a compound having the acetic acid structure as its nucleus. No. 2,129,600. Percy W. Zimmerman and Albert E. Hitchcock to Boyce Thompson Institute for Plant Research, all of Yonkers, N. Y.

Propagation plants from cuttings, etc., inducing root growth by subjecting cutting to action of an indole substitution product of a compound having the propionic acid structure as its nucleus. No. 2,129,601. Percy W. Zimmerman and Albert E. Hitchcock to Boyce Thompson Institute for Plant Research, all of Yonkers, N. Y.

Insectproof paper for use in building construction, having a felt base saturated with a mixture of asphalt paint, arsenate of lead, and nicotine sulfate. No. 2,129,659. Newton P. Easling, Pekin, Ill.

Composite abrasive sheet, having a coating attached thereto. No. 2,129,-661. Albert L. Ball, Lewiston Heights, Lewiston, N. Y., to Carborundum Co., Niagara Falls, N. Y.

Method avoiding corrosion of chromium alloy steel by corrosive liquid reactants necessary for and corrosive liquid reaction products resulting from synthesis of urea from ammonia and carbon dioxide, adding to liquids a polyvalent metal. No. 2,129,689. Harry C. Hetherington, Charleston, W. Va., to du Pont, Wilmington, Del.

Hydroformed lacquer composition; a solution of a soluble cellulose derivative in an organic vehicle, comprising a volatile hydrocarbon liquid. No. 2,129,735. Robert T. Haslam, Westfield, N. J., to Standard-I. G. Company, corp. of Del.

Method of obtaining spinning solutions for production of filaments, etc., from waste filaments, etc., of a water-insoluble organic derivative of cellulose. No. 2,129,737. Thomas Harvey Hilliard, Drummondville, Quebec, Canada, to Celanese Corp. of America, corp. of Del.

Process of tanning with aldehydes; treating pickled skins directly, and without first depickling simultaneously, with a buffer salt and an aldehyde. No. 2,129,748. Harold G. Turley, Moorestown, N. J., and Ian C. Somerville, Phila., to Rohm & Haas Co., Phila., Pa.

Device for chemically analyzing aqueous solutions, consisting of a sheet of absorbent paper and a waxy material repellent to such solutions. No. 2,129,754. Herman Yagoda, to Carl Schleicher & Schull Co., both of New York City.

Friction element containing a tannin, an iron salt of an acid, and a drying fatty oil. No. 2,129,794. Ray E. Spokes, Ann Arbor, Mich., to American Brake Shoe & Foundry Co., corp. of Del.

Manufacture morpholine and certain homologues. No. 2,129,805. Alexander L. Wilson, Pittsburgh, Pa., to Union Carbide & Carbon Corp., corp. of N. Y.

Process tanning with zirconium salts. No. 2,129,854. Gustav Mauthe and Hermann Noerr, Leverkusen-I. G. Werk, Germany, to I. G., Frankfort-onMain, Germany.

Method coloring coal; subjecting a freshly fractured coal surface to action of an alkali or alkaline earth ferricyanide and a ferric salt. No. 2,129,901. Walter Frank Glinsmann, Jersey City, N. J., to American Cyanamid Company, N. Y. City.

Method coloring coal. No. 2,129,902. George Barsky, New York City, and Waldemar C. Hansen, Westfield, N. J., to American Cyanamid Co., New York City.

Paint paste consisting of finely divided and refined zirconium silicate comprising unconverted $ZrSiO_4$ intimately associated and wetted by agitation with linseed oil. No. 2,129,925. Henry A. Gardner, Washington, D. C., to Titanium Alloy Mfg. Co., N. Y. City.

Manufacture abrasive coated articles. No. 2,129,954. Harry Clifford Martin, Frederick Anthony Upper, and Joseph Bradley Aust to Carborundum Co., all of Niagara Falls, N. Y.

Production azo dyestuffs. No. 2,129,964. Hans Roos, Leverkusen-I. G.-Werk, Germany, to General Aniline Works, N. Y. City.

U. S. Chemical Patents
Off. Gaz.—Vol. 493, Nos. 4, 5—Vol. 494, Nos. 1, 2, 3, 4—p. 55

U. S. Chemical Patents

Off. Gaz.—Vol. 493, Nos. 4, 5—Vol. 494, Nos. 1, 2, 3, 4—p. 56

Composition for a negative storage battery plate consisting of an oxide of lead and a lead salt of hymatomelanic acid. No. 2,130,103. John A. Schaeffer and Harold R. Harner, Joplin, Mo., to Eagle-Picher Lead Co., Cincinnati, Ohio.

Paste for lead-acid storage battery plates consisting of one or more oxides of lead and another substance. No. 2,130,104. John A. Schaeffer and Harold R. Harner, Joplin, Mo., to Eagle-Picher Lead Co., Cincinnati, Ohio.

Paste for lead acid storage battery electrodes. No. 2,130,105. John A. Schaeffer and Harold R. Harner, Joplin, Mo., to Eagle-Picher Lead Co., Cincinnati, Ohio.

Laminated metal and asbestos gasket. No. 2,130,110. John H. Victor, Wilmette, and Joseph B. Victor, Oak Park, Ill., to Victor Mfg. & Gasket Co., Chicago, Ill.

Ignition composition for cigarettes or cigars made from chlorate of potash, gum acacia, starch, manganese dioxide, silica, and carbon. No. 2,130,115. John Biddle, Whitwick, England, to Morris Margolis, London, England.

Buffing compound comprising a homogeneous, solid mixture of a water-dispersible petroleum sulfonate soap and finely divided abrasive. No. 2,130,128. William K. Griesinger, Lansdowne, Pa., to Atlantic Refining Co., Phila., Pa.

Process for rendering cotton water repellent without destroying its porosity, softness and dyeing properties. No. 2,130,150. Alexander Nathansohn, Berlin-Wilmersdorf, Germany.

Adhesive for attaching abrasive particles to a backing made from a heat-hardenable alkyd resin and a water soluble resin containing boric acid in combination. No. 2,130,194. Norman P. Robie to Carborundum Co., both of Niagara Falls, N. Y.

Phonograph record containing a filler, latter being in excess of the combined content of shellac and oxidized abietic acid. No. 2,130,239. James H. Hunter, Lansdowne, Pa., to Radio Corp. of America, corp. of Del.

Formation an emulsifying agent. No. 2,130,326. Robert R. Thurston, Chappaqua, N. Y., to Texas Co., N. Y. City.

Production mother-of-pearl effects on transparent artificial films. No. 2,130,360. Brian Edw. Merriman Miller, London, England, to Celanese Corp. of America, corp. of Del.

Preparation detergent from fatty oil anhydrous glycerine, and fuming sulfuric acid. No. 2,130,361. Fred Weaver Muncie, New Brunswick, N. J., to Colgate-Palmolive-Peet Co., Jersey City, N. J.

Detergent composition which includes a salt of a sulfuric acid ester of a monoglyceride. No. 2,130,362. Fred Weaver Muncie, New Brunswick, N. J., to Colgate-Palmolive-Peet Co., Jersey City, N. J.

Mothproofing detergent composition, consisting of an acid soapy washing agent and a water-soluble mothproofing agent, being at the most only slightly colored in the dry state, soluble in water, and adapted for simultaneous cleaning and rendering mothproof of wool, feathers, hair, etc. No. 2,130,435. Hermann Stotter, Leverkusen-I. G. Werk, and Theodor Harmann, Frankfort-am-Main, Germany, to Winthrop Chemical Co., N. Y. City.

Asphaltic composition for paving roads. No. 2,130,535. Ulric B. Bray, Palos Verdes Estates, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Tanning materials obtained by causing a water-soluble salt of sulfurous acid to act in an aqueous solution upon chloro-lignin; products being in form of their free acids brown and non-hygroscopic powders showing a tanning effect upon animal skin. No. 2,130,550. Ernst Koch and Christoph Thomsen, Frankfort-am-Main-Hochst, and Karl Dachlauer, Hofheim, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture Portland cement. No. 2,130,624. Harry E. Kaiser, Colton, Calif., to Calif. Portland Cement Co., Los Angeles, Calif.

Wetting, cleansing and emulsifying agent. No. 2,130,668. Fritz Gunther, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Printing composition made from formamide and an adhesive selected from the group of casein, glue and gelatine. No. 2,130,807. Paul La Frone Magill, and Chas. Dangelmajer, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Resin-like chlorinated paraffin wax containing 50 to 60% of chlorine. No. 2,130,952. David Wm. Ferguson Hardie and Chas. Ockrent, Liverpool, England, to Imperial Chemical Industries, corp. of Great Britain.

Production abrasive articles; mixing abrasive grains with a vitrifiable bond and a combustible material. No. 20,868. Reissue. Edmund S. Merriam, Marietta, Ohio.

Manufacture fabric from spun glass. No. 2,131,024. Hans Friedrich Carl Cordts, Volksdorf, near Hamburg, Germany, to Thuringische Glaswollindustrie vorm. S. Koch, G. m. b. H., Hamburg, Germany.

A quick-drying bituminous cement for felt roofing. No. 2,131,085. Benjamin Albert Anderton, Grantwood, N. J., to Barrett Co., N. Y. City.

Method modifying properties of asphalts. No. 2,131,205. Alfred A. Wells, Roselle Park, and John O. Collins, Cranford, N. J., to Standard Oil Development Co., corp. of Del.

Accelerator for vulcanization of rubber; a quaternary ammonium salt of diethyldithio-carbamic acid in which one valence of the pentevalent nitrogen atom is satisfied by an aliphatic radical and the other 3 valences are satisfied by carbon atoms of monovalent aliphatic radicals, said salt being devoid of strongly acidic groups. No. 2,131,210. William Baird & John Stanley Herbert Davies, Blackley, Manchester, England, to Imperial Chemical Industries, corp. of Great Britain.

A photographic stencil comprising a sheet of sensitized gelatin applied to one surface of a mesh screen, applying sensitized glue to other side. No. 2,131,225. Theodore E. Kirch and David R. Mead, Sheffield Township Warren County, Pa.

Caulking and sealing composition for joints to render them waterproof and resistant to alkali and acid in spite of changes of temperature, humidity and vibrations; comprising a filler, a high molecular weight linear polymer, and a plasticizer. No. 2,131,342. Emile L. Baldeschwieler, Cranford, N. J., to Standard Oil Development Co., corp. of Del.

Carbon sheet with a front fold having an uncoated front surface and a rear surface of a hard carbon coating; rear fold having an uncoated front surface and a rear surface of a soft carbon coating. No. 2,131,381. Stewart H. Linderman, Burlington, N. J., to Underwood Elliott Fisher Co., N. Y. City.

Coal Tar Chemicals

Preparation meta-nitro-para-toluidine. No. 2,128,511. Charles B. Biswell and Walter V. Wirth, Woodstown, N. J., to du Pont, Wilmington, Del.

Production a chrysene-2-carboxylic acid compound containing in the 8 position a radicle of the group of carboxyl, hydroxyl and amino. No. 2,128,684. Heinrich Vollmann, Frankfort-on-Main-Hochst, and Hans Becker, Hofheim in Taunus, Germany, to General Aniline Works, N. Y. City.

Separation of nitranilines. No. 2,128,699. Robert Frye, Chicago, Ill., to Sherwin-Williams Co., Cleveland, O.

Ammonolysis of nitro-phenols. No. 2,128,700. Robert Frye and Nils H. Vagenius, Chicago, Ill., to Sherwin-Williams Co., Cleveland, O.

Production amino-anthraquinone compounds. No. 2,129,141. Georg Kranzlein, Ernst Diefenbach and Fritz Eggert, Frankfort-on-Main-Hochst, Germany, to General Aniline Works, N. Y. City.

Production nitrogen-containing organic compounds. No. 2,129,264. Frederick Baxter Downing, Carneys Point, and Frank Willard Johnson, Penns Grove, N. J., to du Pont, Wilmington, Del.

Preparation 2-amino-6-piperidyl-pyridines. No. 2,129,294. Johan Pieter Wibaut, Amsterdam, and Herman Johannes den Hertog, Jr., Deventer, Netherlands, to Dow Chemical Co., Midland, Mich.

Preparation hydroquinone from quinone. No. 2,129,429. Karl Kleimenhagen, La Salle, Ill., to Carus Chemical Co., corp. of Ill.

Hydrogenation of aniline; method of increasing the yield of cyclohexylamine from the start in presence of dicyclohexylamine. No. 2,129,631. Charles F. Winans, Akron, Ohio, to Wingfoot Corp., Wilmington, Del.

Removal and recovery of benzol and naphthalene from gases. No. 2,129,787. Adolf Schmalenbach, Essen, Germany, to Koppers Co., corp. of Del.

Manufacture, from a hydrocarbon substituted halogenated aromatic hydrocarbon, a substituted phenol wherein by rearrangement hydrogen occupies the original halogen position in the benzene ring. No. 2,129,907. Edgar C. Britton to Dow Chemical Co., both of Midland, Mich.

Separation of ortho-, meta- and para-phenylphenols. No. 2,129,908. Edgar C. Britton to Dow Chemical Co., both of Midland, Mich.

Manufacture 8-bromo-1-naphthoic acid; dissolving anhydro-8-hydroxymercuri-1-naphthoic acid in water as the potassium salt and adding an aqueous hydrochloric acid solution of bromine. No. 2,129,917. David Alexander Whyte Fairweather, Grangemouth, Scotland, to Imperial Chemical Industries, corp. of Great Britain.

Preparation 1-acidylamino-2-methyl-4-amino-anthraquinones, wherein acidyl group is of the benzene series. No. 2,129,991. Joseph Deinet, Milwaukee, Wisc., to du Pont, Wilmington, Del.

Production anthraquinonoyl aminoanthraquinones. No. 2,129,993. Joseph Deinet, Milwaukee, Wisc., to du Pont, Wilmington, Del.

Process hydrogenating 5-nitro-phthalide. No. 2,130,480. Paul R. Austin to du Pont, both of Wilmington, Del.

Preparation polyamino carboxylic acids. No. 2,130,505. Ferdinand Munz, Frankfort-am-Main, Germany, to General Aniline Works, N. Y. City.

Preparation diamine-dicarboxylic acid salts. No. 2,130,947. Wallace Hume Carothers to du Pont, both of Wilmington, Del.

Preparation carboxylic acids of capillary action containing isocyclic ring-systems. No. 2,130,989. Kurt Schimmelschmidt to I. G., both of Frankfort-am-Main, Germany.

Condensation products obtained by condensing crude cresol with oleylaldehyde, in presence of chlorosulfonic acid. No. 2,131,249. Gerhard Balle, to I. G., both of Frankfort-on-Main, Germany.

Preparation a mono-iodo-ortho-phenylphenol wherein the substituting iodo-group is attached to the hydroxyl-substituted benzene ring. No. 2,131,258. Wesley C. Stoesser to Dow Chemical Company, both of Midland, Mich.

Production insoluble anthraquinone compounds in concentrated form No. 2,131,419. Wilbert A. Herrett, Hamburg, N. Y., to National Aniline & Chemical Co., N. Y. City.

Coatings

Film-forming protective composition adapted for use on metal surfaces; oily solution of mixture of neutral unsaponifiable oxidized petroleum hydrocarbons obtained by liquid-phase partial oxidation of a mixture of petroleum hydrocarbons. No. 2,128,523. Arthur W. Burwell, Niagara Falls, N. Y., to Alox Corp., N. Y. City.

Transparent coated sheet material; comprising a regenerated cellulose film surfaced on one side with an optically indistinguishable thin, readily fusible, non-tacky skin of a composition comprising a rubber hydrochloride. No. 2,128,652. Edouard M. Kratz and Eugene W. Moffett, Gary, Ind., and Erich Gebauer-Fuelnegg, Evanston, Ill., to Marbon Corp., corp. of Del.

Moistureproof article; a transparent non-fibrous base sheet or film having a continuous transparent moistureproof coating. No. 20,845. Reissue. William Hale Charch, Buffalo, N. Y., and Merlin Martin Brubaker and Frederick M. Meigs, Wilmington, Del., to du Pont, Wilmington, Del.

Coated product comprising a plaster surface treated with deacetylated chitin, said surface having coating of a drying oil modified alkyd resin. No. 2,128,961. Gordon D. Patterson to du Pont, both of Wilmington, Del.

Product comprising wood having a priming coat comprising deacetylated chitin; over priming coat a surface coating of a film-forming polyhydric alcohol ester of drying oil acids. No. 2,128,962. Gordon D. Patterson to du Pont, both of Wilmington, Del.

Self-emulsifying composition, useful as a coating composition for fruits, characterized in emulsified form by its stability in presence of either weak acids or the impurities of hard or natural water or in presence of both. No. 2,128,973. Wendell H. Tisdale, Cleveland Heights, Ohio, and Albert L. Flenner, Wilmington, Del., to du Pont, Wilmington, Del.

Coating composition for protecting cellulose and like organic combustible matter, particularly against thermal decomposition. No. 2,129,156. Elmer W. Trolander and William Courtney Wilson, to Pyroxylin Products, all of Chicago, Ill.

Manufacture composite cellulose derivative sheeting. No. 2,129,456. Clarence L. Wynd and William H. Groth, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Sound record comprising a coated base material. No. 2,129,731. Samuel B. Devlin, New York City, to John Hulsmann, Rocky Point, N. Y.

Colored silicate coating for granules of refractory material, composed of sodium silicate and chrome oxide to produce a roughly dispersed paint mixing together paint, granules and powdered boric acid, then heating No. 2,129,841. Carl E. Hillers to Blue Ridge Slate Corp., both of Charlottesville, Va.

Coating for blue print paper comprising a light-reducible ferric complex, a ferricyanide salt and a salt of an aliphatic nitrogen base. No. 2,130,070. Clyde A. Crowley and George H. Goodyear, to Huey Co., all of Chicago, Ill.

Coating for blue print paper comprising a light-reducible ferric complex a ferricyanide and cesium salt. No. 2,130,071. Clyde A. Crowley and George H. Goodyear to Huey Co., all of Chicago, Ill.

U. S. Chemical Patents

Production cellulose ester foils; pouring a cellulose ester solution to form a film, subjecting film to action of a precipitating liquid, finally pouring solution of cellulose ester on film to form a layer thereon. No. 2,130,149. Kurt Nagel and Ludwig Scheffer, Mainz-Mombach, Germany, to Deutsche Gold-und Silber Scheideanstalt, vormals, Roessler, Frankfort-on-Main, Germany.

Tinning compound consisting of a solvent of water, copper, sulfate, and sulfuric acid, a base of silica powder, gum arabic, and mercury. No. 2,130,211. Morris M. Savedoff, Brooklyn, N. Y.

Cellulose derivative coating composition. No. 2,130,238. Chad H. Humphries to Sealkote Corp., both of Chicago, Ill.

Formation moistureproof and greaseproof containers. No. 2,130,355. Donald G. Magill, Great Neck, N. Y., to American Can Co., N. Y. City.

Coating for fibrous surfaces. No. 2,130,530. John Fletcher, Kenmore, N. Y., to Plastergon Wall Board Co., Buffalo, N. Y.

Thermally stabilized coating consisting of a polymer of a substance responding to formula $CH_2=CH-X$ and a pitch containing at least one tar base boiling above 240° C. No. 2,130,924. Arthur W. Johnson and Geo. H. Young, Pittsburgh, Pa., to Stoner-Mudge, Inc., corp. of Penna.

Impregnated felt; consisting of fibers produced by cooking wood with a reagent of the group of caustic alkali and alkaline sulfides, then impregnating felt with a waterproofing material. No. 2,131,097. Pierre Drewsen, Sandusky, O., to Barrett Co., N. Y. City.

Process for coloration of textiles or film comprising a synthetic resin. No. 2,131,098. Henry Dreyfus, London, England.

Photomechanical production of single- or multi-color pictures or writing on hard material, using a light-hardening coating in process. No. 2,131,-298. Leopold Prinz, London, England, and Paul Morgenstern, Vienna, Austria, to Primographic Co., London, England.

Manufacture a "Urushi" or Japanese lacquer film having pictures or letters. No. 2,131,330. Akinari Ozawa, Omori-ku, Tokyo, Japan, to Kikari Shoji Kabushiki Kaisha, Tokyo, Japan.

Dyes, Stains, Etc.

Production water-soluble azo dyestuffs; forming heavy metal complex compounds, yielding brown to violetish-brown to blackish-brown shades. No. 2,128,508. Richard Stusser, Cologne, and Friedrich Muth, Leverkusen, Germany, to General Aniline Works, N. Y. City.

Production vat dyestuffs. No. 2,128,514. Wilhelm Eckert and Ernst Fischer, Frankfort-on-Main-Hochst, Germany, to General Aniline Works, N. Y. City.

Production disazo dyestuffs. No. 2,128,537. Jose Stephen Petrus-Blumberger, Delft, Netherlands, to General Aniline Works, N. Y. City.

Preparation for printing vegetable fibers; applying to fiber a printing paste containing a dyestuff. No. 2,128,599. Otto Albrecht, Basel, and Max Bommer and Fritz Grieshaber, Riehen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Swtzerland.

Coloring matter of the phthalocyanine series containing at least as a major part a compound of the empirical formula $C_{32}H_{15}N_8ClCu$. No. 2,129,013. Reginald Patrick Linstead, London, and Charles Enrique Dent, Manchester, England, to Imperial Chemical Industries, corp. of Great Britain.

Production dyestuffs of the anthracene series. No. 2,129,014. Frank Lodge and Colin Henry Lumsden, Blackley, Manchester, England, to Imperial Chemical Industries, corp. of Great Britain.

Production solid diazonium salts. No. 2,129,136. Ferdinand Keller and Wilhelm Koch, Offenbach-on-Main, Germany, to General Aniline Works, N. Y. City.

Manufacture new azine dyestuffs. No. 2,129,677. Francis Henry Swinden Curd, Blackley, Manchester, England, to Imperial Chemical Industries, corp. of Great Britain.

Production azine dyestuffs. No. 2,129,678. Francis Henry Swinden Curd, Blackley, Manchester, England, to Imperial Chemical Industries, corp of Great Britain.

Manufacture anthraquinone vat dyestuffs which dissolve in concentrated sulfuric acid with a brown color and dyes cotton from a brownish-red alkaline hydrosulfite vat in brown shades which become olive green in air. No. 2,129,934. Francis Irving and Cecil Shaw, Grangemouth, Scotland, to Imperial Chemical Industries, corp. of Great Britain.

Preparation dyestuffs of the dioxazine series. No. 2,130,016. Georg Kranzlein and Heinrich Greune, Frankfort-on-Main, and Gerhard Langbein, Hofheim-in-Taunus, Germany, to General Aniline Works, N. Y City.

Production intermediates of the anthraquinone series. No. 2,130,031. William L. Rintelman, Carrollville, Wis., to du Pont, Wilmington, Del.

Production azo compounds. No. 2,130,358. Jas. G. McNally and Jos. B. Dickey to Eastman Kodak Co., all of Rochester, N. Y.

Liquid sulfur dye; being a concentrated, filterable solution of sulfurized dyestuffs, comprising a sulfurized dyestuff dissolved and reduced in a concentrated composite solution of sodium sulfide and sodium hydrosulfide. No. 2,130,415. Arthur J. Buchanan to Southern Dyestuff Corp., both of Charlotte, N. C.

Liquid sulfur dye being a concentrated, filterable solution of sulfurized dyestuff dissolved and reduced in a concentrated composite solution of sodium sulfide -disulfide and -hydrosulfide. No. 2,130,416. Arthur J. Buchanan to Southern Dyestuff Corp., both of Charlotte, N. C.

Preparation leucoindigo, first mixing a phenylglycine fusion mass containing indoxyl with caustic alkali and indigo in excess of water. No. 2,130,878 Alfred Davidson and Colin Henry Lumsden, Blackley, Manchester, England, to Imperial Chemical Industries, corp. of Great Britain.

Process for increasing fastness of dyeings of acid dyestuffs on wool, natural silk, leather, etc., which contain basic artificial resin. No. 2,131,121. Paul Schlack, Berlin-Treptow, Germany, to I. G., Frankfort-on-Main, Germany.

Increasing affinity for acid dyestuffs of wool, natural silk, artificial fibers containing a basic artificial resin, and artificial fibers containing a basic cellulose derivative. No. 2,131,146. Paul Schlack, Berlin-Treptow, Germany, to I. G., Frankfort-on-Main, Germany.

Production vat dyestuffs of the benzanthronylaminoanthraquinone series. No. 2,131,176. Ernest Honold, Frankfort-on-Main-Fechenheim, Germany, to General Aniline Works, N. Y. City.

Printing paste containing mordant dyestuff for printing on lustrous fibres. No. 2,131,320. Emil Gubler, Basel, Switzerland, to Durand & Huguenin S. A., Basel, Switzerland.

Production vat dyestuffs of the anthraquinone series. No. 2,131,480. Heinrich Neresheimer and Wilhelm Ruppel, Ludwigshafen-on-Rhine Germany, to General Aniline Works, New York City.

Production organic dyestuffs containing at least once the grouping—$(C_2H_4OC_2H_4O)n$—H, in which n represents a whole number. No. 2,131,-712. Conrad Schoeller, Gustav Schwen and Georg Kraemer, Ludwigshafen-on-Rhine, Germany, to General Aniline Works, N. Y. City.

Explosives

Blasting explosive cartridge or borehole charge. No. 2,128,576. Albert Greville White, Saltcoats, Scotland, to Imperial Chemical Industries, corp. of Great Britain.

Plastic explosive composition; composed of a liquid explosive nitric ester, a gelatinizing agent, and a plastic clay. No. 2,129,367. Vernon Harcourt Williams, Ardrossan, Ayrshire, Scotland, and Bernard William Foster, Blackheath, London, England, to Imperial Chemical Industries, corp. of Great Britain.

Method increasing sensitiveness to detonation of ammonium nitrate, by adding to crystals of latter a solution of a metal nitrate and drying. No. 2,130,712. Robt. W. Cairns to Hercules Powder Co., both of Wilmington, Del.

Non-explosive pyrotechnic composition including a metallic oxidizing agent, a metallic fuel, and light-intensifying or alkaline earth. No. 2,131,-041. George C. Hale, Dover, N. J.

Smokeless powder having incorporated therein an inorganic substance selected from the group of antimony sulfide, metallic antimony powder, and antimony oxide. No. 2,131,061. Henry N. Marsh, to Hercules Powder Co., both of Wilmington, Del.

Smokeless powder including an inorganic, cadmium-containing substance. No. 2,131,352. Henry N. Marsh to Hercules Powder Co., both of Wilmington, Del.

Smokeless powder including metallic cobalt. No. 2,131,353. Henry N. Marsh, to Hercules Powder Company, both of Wilmington, Del.

Smokeless powder containing manganese dioxide. No. 2,131,354. Henry N. Marsh to Hercules Powder Co., both of Wilmington, Del.

Smokeless powder including an inorganic silicon-containing substance, selected from the group consisting of ground glass and calcium silicide. No. 2,131,383. Henry N. Marsh to Hercules Powder Company, both of Wilmington, Del.

Explosive composition capable of being combined with additional ingredients to form nitroglycerin high explosives of the gelatinous type; composed of at least one liquid nitric ester, containing at least 2 nitrate groups, a gelatinizing agent, a combustible absorbent material, and a material insoluble in water and possessing lubricating properties in gelatinous explosives. No. 2,131,574. Ralph A. Tapley, McMasterville, Que., Canada, to du Pont, Wilmington, Del.

Fine Chemicals

Preparation free methane-sulfonic acids of pyrazoloneamines. No. 2,128,512. Max Bochmuhl and Leonard Stein, Frankfort-on-Main-Hochst, Germany, to Winthrop Chem. Co., N. Y. City.

Production light-sensitive emulsion. No. 2,129,207. George Earle Fallesen and Cyril J. Staud to Eastman Kodak Co., all of Rochester, N. Y.

A thermographic element comprising a support and a heat-sensitive colloid layer containing a heat-sensitive oxalate and as the only sensitizer for the latter a polyhydroxy alcohol having not more than 5 hydroxy groups in the molecule. No. 2,129,242. Samuel E. Sheppard and Waldemar Vanselow, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Screens for X-ray photography. Nos. 2,129,295-6. Karl Wurstlin to Kali-Chemie Aktiengesellschaft, both of Berlin, Germany.

Manufacture laevoascorbic acid; heating such derivatives of 2-keto-laevo-gluconic acids as are readily hydrolyzable by acids with acids in an anhydrous alcohol solution. No. 2,129,317. Franz Elger, Basel, Switzerland, to Hoffmann-La Roche, Inc., Nutley, N. J.

Preparation camphene; isomerizing a terpene by heating same in presence of vermiculite. No. 2,129,323. Clyde O. Henke, Wilmington, Del., and Gastao Etzel, Pitman, N. J., to du Pont, Wilmington, Del.

Production mercurized halogen methane sulfonic acids and their salts. No. 2,129,988. Arthur Binz, Berlin, Germany, and Boland Hughes Carbondale, Pa., to Winthrop Chemical Co., New York City.

Production quinone and hydroquinone. No. 2,130,151. Herbert Palfreeman, Manchester, and Norman Victor Sydney Knibbs, Kent, England.

Photographic layers containing bleaching-out dyes. No. 2,130,572. Bruno Wendt, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Preparation photographic emulsion containing alkyl quaternary salts of thiazoles, and the like, as antifoggants. No. 2,131,038. Leslie G. S. Brooker and Cyril J. Staud, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Fine grain transluscent screen. No. 2,131,039. Rupert H. Draeger, U. S. Navy.

Glass, Ceramics

Glazing glass; a lime soda, high-silica, colorless and non-blooming sheet of glass, comprising silicon dioxide, potassium oxide, calcium oxide, antimony oxide, aluminum and iron oxides. No. 2,128,702. Frederick Gelstharp, Tarentum, Pa., to Pittsburgh Plate Glass Co., Allegheny County, Pa.

Production transparent glass colors. No. 2,130,215. James H. Young, Elizabeth, N. J., to du Pont, Wilmington, Del.

Industrial Chemicals, Etc.

Production alkoxy derivatives of methacrylic acid esters. No. 2,128,208. Ralph A. Jacobson to du Pont, both of Wilmington, Del.

Conversion hydrocarbons. No. 2,128,220. Horace B. Cooke, Clarendon, Va., to Process Management Co., New York City.

Fractional short-path distillation. No. 2,128,223. Ronald George Juta Fraser, Aylmerton, England, to Imperial Chemical Industries, corp. of Great Britain.

Carbon monoxide manufacture. No. 2,128,262. Louis L. Newman, Brooklyn, N. Y., to Semet-Solvay Engineering Corp., New York City.

Process oxidizing a ferrous compound dissolved in a solution of a heavy metal salt. No. 2,128,311. Albert T. Mertes, Newport, Del., to du Pont, Wilmington, Del.

Method inhibiting foaming of a phthalic acid solution; passing stream of the solution into a flash chamber maintained at an absolute pressure below about 250 m.m. of mercury. No. 2,128,323. Donald Atwater Rogers, Petersburg, and Ernest Whiting Bowen, Prince George County, Va., to Solvay Process Co., New York City.

Ultra violet light filter composition. No. 2,128,334. Frits E. Stockelbach, Montclair, N. J.

U. S. Chemical Patents

Off. Gaz.—Vol. 493, Nos. 4, 5—Vol. 494, Nos. 1, 2, 3, 4—p. 58

Production solutions for use in the manufacture of colored artificial filaments, etc. No. 2,128,338. William Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Preparation stable solutions of acetone insoluble triacetate soluble in concentrated acetic acid. No. 2,128,340. Karl Werner, Mainz-Mombach, Germany.

Production new and valuable drying oils from fish oils having an iodine content number greater than approx. 120. No. 2,128,354. Eric William Fawcett, Northwich, and Eric Everard Walker, Blackley, Manchester, England, to Imperial Chemical Industries, corp. of Great Britain.

Manufacture moistureproof initial igniting body; mixing in an organic solvent, to form a pasty mixture, resol, a chlorate of alkali, and combustible and filling materials. No. 2,128,368. Lars Erik Larsson, Jonkoping, Sweden, to Aktibolaget Siefvert & Fornander, Kalmar, Sweden.

Process for eliminating positively charged colloids from beverages containing same; contacting beverage with a purified alpha cellulose containing adsorbed hydroxyl groups. No. 2,128,432. William D. Ramage, Berkeley, Calif.

Aerating device for use in production of acetic acid from alcohol. No. 2,128,445. Morgan Williams, Worcester, England.

Process for absorption in highly concentrated nitric acid, of nitrous gases formed by combustion of ammonia. No. 2,128,527. Thomas Fischer to Bamag-Meguin Aktiengesellschaft, both of Berlin, Germany.

Method recovering alginous material from seaweed. No. 2,128,551 Victor Charles Emile Le Gloahec, Saint-Marc, near Brest, France, and John Robert Herter, New York City, to Algin Corp. of America, Dover, Del.

Invertase solution containing diacetin. No. 2,128,605. Edw. Romar Dawson, Epsom, England, to Distillers Co., Edinburgh, Scotland.

Production solvent; first subjecting pine tar in presence of a catalyst to action of hydrogen. No. 2,128,609. Jacquelin E. Harvey, Jr., Hapeville, Ga.

Production compounds containing the acticopholane ring from their halogen addition products. No. 2,128,622. Leopold Ruzicka, Zurich, and Ludwig Ehmann, Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Laminated structure whose base has rubber adhering thereto. No. 2,128,635. William Hale Charch, Buffalo, N. Y., and Dorothy Bateman Maney, Old Hickory, Tenn., to du Pont, Wilmington, Del.

Manufacture non-inflammable articles of organic fibrous materials. No. 2,128,782. Bernhard Muller, Berlin-Charlottenburg, Germany, to Rutgerswerke-Aktiengesellschaft, Berlin, Germany.

Melting cyanides; melting an alkali metal cyanide at a pressure less than atmospheric. No. 2,128,819. Donald A. Holt, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Production an improved diatomaceous earth filter-aid characterized by its high flow-rate. No. 20,844. Reissue. Robert Calvert, Scarsdale, N. Y., and Karl L. Dern, Burlingame, and Gordon A. Alles, Los Angeles, Calif., to Celite Corp, New York City.

Production aralkyl ether esters. No. 2,128,901. Shailer L. Bass and Edward M. Van Duzee to Dow Chemical Co., all of Midland, Mich.

Production aralkyl ethers of hydroxy benzoates. No. 2,128,902. Shailer L. Bass, and Edward M. Van Duzee, deceased, by Clarence H. Macomber, administrator, to Dow Chemical Co., all of Midland, Mich.

Production oxygenated compounds. No. 2,128,908. Joseph Elliott Bludworth, Arlington, Tex., to Celanese Corp. of America, corp. of Del.

Production oxygenated compounds; subjecting aliphatic hydrocarbons in vapor phase to oxidation with free oxygen in presence of hydrocarbon vapor and in absence of oxidation catalysts. No. 2,128,909. Joseph Elliott Bludworth, Arlington, Tex., to Celanese Corp. of America, corp. of Del.

Process transporting coal; changing its state to a pumpable fluid by grinding and mixing the disintegrated coal with water and an easily precipitated suspending agent. No. 2,128,913. Robert E. Burk, to Standard Oil Co., both of Cleveland, Ohio.

Treatment soya bean oil, particularly with respect to extending its prereversion period. Nos. 2,128,925-6-7. Albert K. Epstein, Chicago, Ill.

Preparation tetraphosphoric acid esters. No. 2,128,946. Morris B. Katzman, Chicago, Ill.

Production aralkyl ethers of the hydroxybenzoates. No. 2,128,975. Edward M. Van Duzee and Shailer L. Bass, to Dow Chemical Co., all of Midland, Michigan.

Treatment synthetic benzine products from hydrogen and the oxides of carbon. No. 2,128,994. Franz Fischer and Herbert Koch, to Studien- und Verwertungs-Gesellschaft mit beschrankter Haftung, all of Mulheim-Ruhr, Germany.

Manufacture crystalline luminescent material. No. 2,129,096. Humboldt W. Leverenz, Collingswood, N. J., to Radio Corp. of America, corp. of Del.

Light filter having material associated therewith which is an absorbent for light rays within the range 3400-4000 A. No. 2,129,131. Archibald Stuart Hunter, Kenmore, N. Y., to du Pont, Wilmington, Del.

Light filter having associated therewith a derivative of phenyl hydrazine; said light filter transmitting at least 50% of available solar light and absorbing at least 90% of light within the range 3500-3700 A. No. 2,129,132. Archibald Stuart Hunter, Kenmore, N. Y., to du Pont, Wilmington, Del.

Preparation titanium compound containing titanium, oxygen, and carbon. No. 2,129,161. Charles J. Kinzie and Eugene Wainer, Niagara Falls, N. Y., to Titanium Alloy Manufacturing Co., New York City.

Purification maleic anhydride. No. 2,129,166. Joyce H. Crowell, Buffalo, N. Y., to National Aniline & Chemical Co., N. Y. City.

Production fluorine containing derivative of a compound of the group of rubber, synthetic rubber-like masses and substitutes for rubber; contacting compound with fluorine diluted by an indifferent gas. No. 2,129,289. Julius Soll, Leverkusen-I. G. Werk, Germany, to I. G., Frankfort-on-Main, Germany.

Recovery a volatile solvent from a mixture of carrier gas and vapor of the solvent. No. 2,129,299. Francis R. Bichowsky, Toledo, Ohio, to Dow Chemical Co., Midland, Mich.

Recovery of sodium chloride and sodium chlorite from aqueous solutions. No. 2,129,464. George Lewis Cunningham, Niagara Falls, N. Y., to Mathieson Alkali Works, N. Y. City

Catalyst and catalytic process. No. 2,129,507. Paul Lawrence Salzberg, Carrcroft, Wilmington, Del., to du Pont, Wilmington, Del.

Short path, high vacuum distillation of solid distillable material. No. 2,129,596. Hein Israel Waterman, Delft, and Cornelus Van Vlodrop, Rotterdam, Netherlands, to Imperial Chemical Industries, corp. of Great Britain.

Addition product of zinc benzothiazyl mercaptide and cyclohexyl amine, associated with not more than 10% of material extraneous to such product. No. 2,129,621. Joy G. Lichty, Stow, Ohio, to Wingfoot Corp., Wilmington, Del.

Polymerization of an ester of an aliphatic monohydric secondary alcohol. No. 2,129,663. Harold J. Barrett to du Pont, both of Wilmington, Del.

Compound roll having a martensitic white sleeve-structure and a softer core. No. 2,129,683. Hans Gontermann & Ferdinand Kuhn, Siegen Germany.

Process and apparatus for removing water from aqueous aliphatic acids. No. 2,129,684. Jack J. Gordon and Frederick R. Conklin, Kingsport, Tenn., to Eastman Kodak Co., Jersey City, N. J.

Preparation n-propylmethacrylate. No. 2,129,690. Rowland Hill, Blackley, Manchester, England, to Imperial Chemical Industries, corp. of Great Britain.

Treatment fluid reactants comprising hydrocarbons free of other or extraneous reactant fluid with a bed of solid contact or catalytic mass. No. 2,129,693. Eugene J. Houdry, Rosemont, Pa., to Houdry Process Corp., Dover, Del.

Solvent for use in treatment of ores; reaction product resulting from passing chlorine gas into an aqueous solution of an alkali metal cyanide compound until solution is orange red in color. No. 2,129,700. Merrill W. MacAfee, Los Angeles, Calif.

Method treating a low substituted urea cellulose with aqueous caustic alkali in presence of a zincate. No. 2,129,708. Richard S. Schreiber, to du Pont, both of Wilmington, Del.

Production new high molecular sulfur-containing condensation products. No. 2,129,709. Hermann Schuette, Mannheim, and Conrad Schoeller and Max Wittwer, Ludwigshafen-on-Rhine, Germany, to I. G., Frankfort-on-Main, Germany.

Method bleaching cellulosic materials without substantial degradation of the fiber, suspending same in an aqueous alkaline solution. No. 2,129,719. George P. Vincent to Mathieson Alkali Works, both of N. Y. City.

Production anhydrous sodium sulfate from a boiling water solution. No. 2,129,813. Robert Roger Bottoms to Girdler Corp., both of Louisville, Ky.

Process crystallizing dextrose. No. 2,129,864. William B. Newkirk Western Springs, Ill., to Corn Products Refining Co., N. Y. City.

Apparatus and method for sulfonating fatty compounds. No. 2,129,896. Daniel S. Whiteman, Phila., Pa., to Reilly-Whiteman-Walton Co. Conshohocken, Pa.

Compressed starch pellet; compressed mass of corn starch particles containing and bonded together by an interspersion of pre-dried particles of glucose. No. 2,129,919. Howard File, to A. E. Staley Mfg. Co., both of Decatur, Ill.

Production phthalic esters from impure phthalic acid. No. 2,130,014. Alphons O. Jaeger, Greentree, and Herbert J. West, Mount Lebanon, Pa., to American Cyanamid & Chemical Corp., New York, N. Y.

Recovery non-sugars from liquid saccharine materials. No. 2,130,029. Gustave T. Reich, Phila., Pa.

Method crystallizing a salt from solution. No. 2,130,065. William E. Burke, William H. Allen, Robert B. Peet, Charles F. Ritchie and William A. Gale to American Potash & Chemical Corp., all of Trona, Calif.

Manufacture gas consisting entirely of CO and nitrogen and free of oxygen, hydrogen, moisture, and sulfur impurities. No. 2,130,163. William Tiddy, N. Y. City, Charles H. Hughes, Glen Ridge, N. J., and Reginald P. Oliveros, Brooklyn, N. Y., to Semet-Solvay Engineering Corp., N. Y. City.

Separation and gas treatment of gas-dust mixtures, particularly in thermal and chemical process. No. 2,130,210. Kurd von Haken, Berlin, Germany.

Composition comprising polyvinyl alcohol treated with cuprammonium hydroxide solution. No. 2,130,212. William W. Watkins, Buffalo, N. Y., to du Pont, Wilmington, Del.

Manufacture olefine chlorohydrins. No. 2,130,226. Edgar C. Britton, Howard S. Nutting and Myron E. Huscher, to Dow Chemical Co., all of Midland, Mich.

Condensation products of an alkali metal salt of toluenesulfonamide with formaldehyde. No. 2,130,342. Hellmuth Hahn and Karl Memminger, to Fahlberg-List Aktiengesellschaft Chemische Fabriken, all of Magdeburg-Sudost, Germany.

Batch process in which a zinc salt solution is atomized in a container with hydrogen sulfide to form zinc sulfide precipitate. No. 2,130,382. Lewis Covell Copeland and John Reid Stone, Palmerton, Pa., to New Jersey Zinc Co., N. Y. City.

Preparation of a condensation product of a polyvinyl alcohol and an aldehyde which gives a solution of high viscosity in a previously selected organic solvent. No. 2,130,451. Georges E. Zelger, Montreuil-sous-Bois, Seine, France, to Eastman Kodak Co., Jersey City, N. J.

Process treating smooth, staple cellulosic fibers with solution containing colophony, cetyl sodium sulfate, and caustic soda. No. 2,130,460. John Gwynant Evans, Blackley, and Sidney Arthur Slater, Stretford, England, to Imperial Chemical Industries, London, England.

Production phosphoric acid and concentrated nitric acid. No. 2,130,483. Benton A. Bull to du Pont, both of Wilmington, Del.

Preparation tetrahydrofurfurane, bringing an alkyl succinate into contact with hydrogen in presence of a copper chromite catalyst. No. 3,130,501. Wilbur Arthur Lazier, Marshallton, Del., to du Pont, Wilmington, Del.

Production high molecular weight iso-olefine polymers. No. 2,130,507. Michael Otto and Martin Mueller-Cunradi, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Treatment mixtures of nitrosyl chloride and chlorine. No. 2,130,519. Herman A. Beekhuis, Jr., Petersburg, Va., to Solvay Process Co., N. Y. City.

Preparation linear polyamides. No. 2,130,523. Wallace H. Carothers to du Pont, both of Wilmington, Del.

Preparation hydroxy alkyl ethers of hydrogenated hydroxy diphenyl compounds. No. 2,130,525. Gerald H. Coleman and John W. Zemba to Dow Chemical Co., all of Midland, Mich.

Preparation diphenyl hydroxy alkyl ethers. No. 2,130,526. Gerald H. Coleman and John W. Zemba to Dow Chemical Co., all of Midland, Mich.

Preparation hydroxy-alkyl ethers of hydroxy-diphenyl compounds. No. 2,130,527. Gerald H. Coleman and John Zemba to Dow Chemical Co., all of Midland, Mich.

Preparation solution of calcium-repressing alkali-metal metaphosphate from water-insoluble alkali-metal metaphosphates. No. 2,130,557. Casimir J. Munter, Dormont, Pa., to Hall Labs., Pittsburgh, Pa.

Method of comminuting wood for making carbons. No. 2,130,566. Richard W. Schmidt, Redondo Beach, Calif., to Evanston Co., Los Angeles, Calif.

Recovery vanadium from phosphoric acid solutions containing small amounts of vanadium in a state of oxidation not greater than V_2O_4. No. 2,130,579. Frederic C. Bowman to A. R. Maas Chemical Co., both of Los Angeles, Calif.

Precipitation of zinc sulfide with hydrogen sulfide recovery. No. 2,130,742. Arne J. Myrhen and Samuel I. Hammond, Palmerton, Pa. to New Jersey Zinc Co., New York City.

U. S. Chemical Patents

Off. Gaz.—Vol. 493, Nos. 4, 5—Vol. 494, Nos. 1, 2, 3, 4—p. 59

Production a ligno-cellulose-aniline composition, possessing the properties of plastic flow under heat and pressure. No. 2,130,783. Earl C Sherrard, Edward Beglinger, and John Hohf, Madison, Wisc., and Ernest Bateman, deceased, late of Madison, Wis., by Wm. T. Bateman, special administrator, Madison, Wis., to Henry A. Wallace, Sec'y Agriculture of U. S.

Treatment impure aqueous liquids; first forming aqueous dispersion of starch, mixing with an alkaline solution containing a chloride. No. 2,130,789. Curtis Q. McW. Campbell, Pittsburgh, Pa.

Process hydrogenating a resinous polymer of dihydronaphthalene. No 2,130,800. Harold S. Holt to du Pont both of Wilmington, Del.

Manufacture nitric acid esters; submitting an unsaturated organic compound, containing at least one olefinic double bond of unsaturated character linking carbon atoms, to anodic oxidation in presence of an electrolyte containing nitrate ions. No. 2,130,813. Per Valter Ohman to Nitroglycerin Aktiebolaget, both of Gyttorp, Sweden.

Non-caking powder composition comprising particles of silica and trisodium phosphate, and an aluminum compound. No. 2,130,869. Louis Block and Max Metziger to Blockson Chemical Co., all of Joliet, Ill.

Production glycols; first admixing ethylene dichloride with water. No 2,130,891. Nathan M. Mnookin, Kansas City, Mo., to Synthetic Products Inc., corp. of Mo.

Preparation chloro-aryl ethers of ethylene glycol. No. 2,130 990 Gerald H. Coleman and Geo. B. Stratton, to Dow Chemical Co., all of Midland, Mich.

Preparation phenyl mercuric nitrate; reacting an organic phenyl mercuric salt dissolved in a water-miscible organic solvent with a light-insensitive inorganic nitrate whose cation forms a soluble compound with the acid radical of the salt, then adding water. No. 2,131,008. Jas. H Hibben, Washington, D. C., to Carl Maisel, Montclair, N. J.

Production ethers from reactive acid liquor. No. 2,131,030. Francis M. Archibald, Elizabeth, and Helmuth G. Schneider, Roselle, N. J., to Standard Alcohol Co.

Treatment bast or structural fibers with an acid which in normal solution ionizes less than 10% and with a copper salt corresponding to acid. then treating fiber with a soluble sulfide. No. 2,131,040. Joseph L. Goodale, Ipswich, Mass.

Production basic polymeric carbohydrates; reacting a hydroxyl-containing polymeric carbohydrate with an alkylene oxide. No. 2.131,120. Paul Schlack, Berlin-Treptow, Germany, to I. G., Frankfort-on-Main, Germany

Removal pitch from textiles. No. 2,131,137. Ehrhart Franz, Leipzig Germany.

Preparation addition products of glycide. No. 2,131,142. Ludwig Orthner, Frankfort-on-Main and Claus Heuck, Ludwigshafen-on-Rhine Germany, to General Aniline Works, New York City.

Process for increasing reactivity of naturally or artificially shaped articles or materials. No. 2,131,145. Paul Schlack, Berlin-Treptow Germany, to I. G., Frankfort-on-Main, Germany.

Production conversion products from acetylene by treating same with aqueous acid cuprous salt solutions. No. 2,131,197. Robert Stadler and Albert Auerhahn, Heidelberg, Germany, to I. G., Frankfort-on-Main. Germany.

Preparation pentachlorophenol; chlorinating material from the group of phenol and the intermediate chlorophenols in presence of aluminum chloride. No. 2,131,259. Wesley C. Stoesser to Dow Chemical Co., both of Midland, Mich.

Production colloidal fuel. No. 2,131,308. Erwin Blumner, London England.

Manufacture zinc compound from galvanizer's waste. No. 2,131,312. Henry Seymour Colton, Shaker Heights, O.

Manufacture dyed composition cork. No. 2,131,314. Giles B. Cooke to Crown Cork & Seal Co., both of Baltimore, Md.

Consolidation of porous materials. No. 2,131,338. James G. Vail, Media, Pa., to Philadelphia Quartz Co., Phila., Pa.

Preparation methylene halide derivatives of carboxylic acid amides and carbamic esters. No. 2,131,362. Alfred William Baldwin and Henry Alfred Piggott, Blackley, Manchester, England, to Imperial Chemical Industries, corp. of Great Britain.

Production dolomitic magnesium carbonate composition. No. 2,131,374 Bertrand B. Grunwald, deceased, late of Alameda, Calif., by Dorothy H Grunwald, administratrix, Alameda, Calif.

Production chlorine dioxide free of chlorine. No. 2,131,447. John Ogden Logan, Niagara Falls, N. Y., to Mathieson Alkali Works, N. Y. City.

Production anhydrous neutral magnesium carbonate from substance selected from group of dolomite and limestone. No. 2,131,524. Rudolf Schulze, Bitterfeld, Germany, to Magnesium Development Corp., corp of Del.

Cement mass; mixture of cement and a betaine. No. 2,131,533. Karl Daimler and Heinz Thron, to I. G., all of Frankfort-on-Main, Germany.

Cyanidation of precious metals, carrying out in presence of a compound included in the group of thiourea and aldehyde-ammonia condensation products of thiourea. No. 2,131,535. Norman Hedley, Old Greenwich, Conn., to American Cyanamid Co., N. Y. City.

Cleansing composition for molten aluminum baths. No. 2,131,549. Willi Claus to Metallochemische Fabrik, A.-G., both of Berlin, Germany

Production phosphorescent material. No. 2,131,557. Jeremiah F. Goggin, Davenport, Iowa.

Manufacture mineral wool. No. 2,131,599. Arthur T. Shrum, Poland, O., to William C. Coryell, Youngstown, O.

Method drying wet porous masses having solutes therein, first covering surface of mass with a water-slurry of a capillary-active substance which is insoluble in water, then depositing a thin adherent coating of this substance on surface. No. 2,131,645. Thomas K. Sherwood, Wellesley, Mass., and Louis E. Garono, Buffalo, N. Y., to Research Corp., N. Y City.

Continuous process of destructively distilling coal. No. 2,131,702 George A. Berry, to National Fuels Corp., both of Bound Brook, N. J.

Method preparing a stable, crystalline, hydrous sodium silicate. No 2,131,718. George Ridgley McDaniel, Cincinnati, O., to Diamond Alkali Co., Pittsburgh, Pa.

Leather

Tanning lye consisting of the step of adding higher molecular-albumen cleavage products to tanning metal compounds. No. 2,128,092. Ludwig Jablonski, Berlin, and Kurt Lindner, Berlin-Lichterfelde, Germany, to Chemische Fabrik Grunau, Landshoff & Meyer A. G., Berlin-Grunau, Germany.

Metals, Alloys, Ores

Production precipitation hardened alloys. Nos. 2,126,742-3-4-5-6-7-8-9-50. Anthony G. de Golyer, New York City.

Method melting and casting magnesium and alloys rich in magnesium. No. 2,126,786. Leopold Lasch and Georg Schichtel, Radenthein, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.

Method pretreating a conglomerate containing metals adapted to be recovered by amalgamation; adding sodium hydroxide and cupric sulfate to water, then adding the metal bearing conglomerate. No. 2,126,798. John A. Miner, St. Louis, Mo., to Carl A. Hahn, Kirkwood, Mo.

Continuous production metallic magnesium by thermal reduction of raw materials containing magnesia. No. 2,126,825. Hellmuth Seliger, Bitterfeld, Germany, to Magnesium Development Corp., corp. of Del.

Production copper-cobalt-zinc alloy. No. 2,126,827. Cyril Stanley Smith, Cheshire, Conn., to American Brass Co., Waterbury, Conn.

Improving chrome ores, smelting same with a reducing agent to obtain a metal containing more than 70% chromium. No. 2,127,074. Marvin J. Udy, Niagara Falls, N. Y.

Alloy composed of lithium, chromium, and copper. No. 2,127,117. Franz R. Hensel to P. R. Mallory & Co., Inc., both of Indianapolis, Ind.

Production high melting point alloy castings. No. 2,127,239. Shelley M. Stoody, to Stoody Co., both of Whittier, Calif.

Chloridizing-cyanide process for extracting values from ores. No. 2,127,-240. George F. Stott to Eureka Prospect, both of Eureka, Nev., a partnership composed of J. A. Hogle, S. P. Holt, and G. F. Stott.

Readily forgeable alloy steel, characterized by its resistance to hot oxidization and corrosive loss when subjected to attack by lead, containing compounds at temperatures of the order of the operating temperatures of exhaust valves in internal combustion engines. No. 2,127,245. Walter R. Breeler, Troy, N. Y., to Ludlum Steel Co., Watervliet, N. Y.

Process for treating ferruginous titanium ore containing iron in the ferric state to produce titanium compounds. No. 2,127,247. David H. Dawson, East Orange, N. J., Ignace J. Krchma, Brooklyn, and Robert M. McKinney, Linthicum Heights, Md., to du Pont, corp. of Del.

Production magnesium base alloys, characterized by improved ductility and freedom from hot-shortness under mechanical deformation at elevated temperatures. Nos. 2,127,253-4. Edward F. Fischer, Cleveland, Ohio, to Magnesium Development Corp., corp. of Del.

Removal sulfur, arsenic, phosphorus and other undesirable constituents from iron and iron alloys available in form of small lumps; treating same with finely subdivided lime and manganese. No. 2,127,299. Friedrich Johannsen and Werner Volkel, Magdeburg, Germany, to Fried. Krupp Grusonwerk, Aktien-Gesellschaft, Magdeburg/Buckau, Germany.

Magnesium zirconium-copper alloy. No. 2,127,596. Franz R. Hensel and Earl I. Larsen to P. R. Mallory & Co., all of Indianapolis, Ind.

Smelting zinciferous materials. No. 2,127,633. Herand K. Najarian, Beaver, Pa., to St. Joseph Lead Co., New York City.

Separation brookite and rutile from zircon to obtain titanium oxide. No. 2,127,664. Charles J. Kinzie and Eugene Wainer, Niagara Falls, N. Y., to Titanium Alloy Mfg. Co., New York City.

Process tempering gold and silver alloys. No. 2,127,676. Claude H. Coleman, Fairmead, Calif.

Treatment mixture iron arsenide and sulfide ores to produce iron oxides, elementary sulfur and orpiment. No. 2,127,859. Paul D'Aragon, Montreal, Que., Canada.

Method working a solder alloy containing copper and phosphorus. No. 2,128,054. Edward L. Robinson, Wilkinsburg, Pa., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Production sintered alloy containing cobalt, titanium carbide, vanadium carbide, and tungsten carbide. No. 2,128,146. Josef Hinnuber, Essen-Ruttenscheid, Germany, to General Electric Co., Schenectady, N. Y.

Recovery values from zinc concentrates. No. 2,128,379. George Le Roy Spencer, Jr., to American Zinc, Lead & Smelting Co., both of St. Louis, Mo.

Recovery values from zinc ore concentrates. No. 2,128,380. George Le Roy Spencer, Jr., to American Zinc, Lead & Smelting Co., both of St. Louis, Mo.

Purification molten metals and alloys. No. 2,128,444. Emile Vroonen, Brussels, Belgium.

Recovery type metal comprising lead, antimony and tin, from dross formed in re-casting of said metal; fusing dross with oxide dissolving salts comprising zinc chloride. No. 2,125,226. Hans Arne Gosta Gunnelius and Nils Halvard Liander, Stockholm, Sweden.

Brazing alloy composed of copper, cadmium, phosphorus, and silver. No. 2,125,228. Oscar E. Harder to Battelle Memorial Institute, both of Columbus, Ohio.

High temperature duty alloy iron or steel of good hot and cold-rolling characteristics, made from chromium, nickel, tungsten, titanium, carbon, and iron. No. 2,125,299. Vsevolod Nicholas Krivobok, Pittsburgh, Pa., to Rustless Iron and Steel Corp., Balitmore, Md.

Recovery values from oxidized ores; subjecting same to flotation operation in presence of an alkyl mercaptan higher in the series than ethyl mercaptan. No. 2,125,337. Antoine M. Gaudin, Butte, Mont.

Concentration oxidized ores by means of froth flotation. No. 2,125,631. Gregoire Gutzeit, Geneva, Switzerland, to Visura Treuhand Gesellschaft, Zurich, Switzerland.

Recovery ferro-alloy metal of the group of molybdenum, vanadium, tungsten from ore material containing lead. No. 2,125,642. Ralph F. Meyer, Freeport, Pa., to Meyer Mineral Separation Co., Pittsburgh, Pa.

Alloy containing phosphorus, tin, and copper. No. 2,125,680. Alpine Ross MacGregor, Forest Hills, Pa.

Concentration ores and flotation agents therefor. No. 2,125,852. Anderson W. Ralston and William O. Pool to Armour & Co., all of Chicago, Ill.

Production a sponge metal from an oxide of said metal. No. 2,125,909. Rudolf Gahl, Berkeley, Calif.

Alloy iron or steel articles of austenitic structure for use under high temperature conditions of stress, comprising chromium, nickel, tungsten, molybdenum, carbon, and iron. No. 2,125,929. Vsevolod Nicholas Krivobok, Pittsburgh, Pa., to Rustless Iron and Steel Corp., Baltimore, Md.

Magnesium alloy containing aluminum, silver, and magnesium. No. 2,126,010. John Leslie Haughton and William Eliezer Prytherch, Teddington, England.

Furnace brazing of high-chromium metals in an atmosphere of neutral or reducing gas, using bath of molten alkali metal in process. No. 2,126,-074. William A. Wissler, Niagara Falls, N. Y., to Haynes Stellite Co., corp. of Ind.

U. S. Chemical Patents

Off. Gaz.—Vol. 493, Nos. 4, 5—Vol. 494, Nos. 1, 2, 3, 4—p. 60

Metal coated sheet metal product; having zinciferous coating. No. 2,126,244. Nelson E. Cook, Wheeling, W. Va., Edward J. Knopf, Morristown, Ohio, and William L. Diehl, Wheeling, W. Va., to Wheeling Steel Corp., Wheeling, W. Va.

Production cast metal products having elongations before rupture under tensile stress of upwards of 40%; made from alloy composed of silicon, zinc, and copper. No. 2,126,246. Louis S. Deitz, Jr., Westfield, N. J., and Hanley H. Weiser, Annadale, N. Y., to Nassau Smelting and Refining Co., New York City.

Copper-silver-beryllium-magnesium alloy. No. 2,126,386. Franz R. Hensel and Earl I. Larsen to P. R. Mallory & Co., all of Indianapolis, Ind.

Continuous cyclic process for recovery metals from scrap and metallurgical residues. No. 2,128,548. Clarence B. White, Phila., Pa.

Anti-corrosion process for zinc base castings; applying combination of coatings, one produced by immersion in an acidified dichromate solution and one consisting of electro-deposited metal. No. 2,128,550. Jay T. Ford, Flint, Mich., to General Motors Corp., Detroit, Mich.

Concentration ores and minerals by flotation; subjecting pulp to froth flotation in presence of a dixanthogen diluted with an anhydrous water muscible aliphatic monohydric alcohol. No. 2,128,570. Merrill W. MacAfee, Berkeley, Calif., to Great Western Electro-Chemical Co., corp of Calif.

Manufacture steel alloy suitable for cutting tools. No. 2,128,601. William MacCormac Burden, Reginald Genders, and Reginald Harrison Woolwich, London, England, to Sofal, Limited, London, England.

Production ferro-manganese from iron-containing manganese ores or slags. No. 2,128,615. Adolf Krus, Sturzelberg over Neuss, and Hermann Steffe, Duisburg-Huckingen, Germany, to Mannesmannrohren-Werke Aktiengesellschaft, Dusseldorf, Germany, and "Sachtleben," Aktiengesellschaft fur Bergbau und Chemische Industrie, Cologne, Germany.

Case-hardening method for carbon steel. No. 2,128,621. Bernard R Queneau, Milburn, N. J., to U. S. Steel Corp., N. Y. City.

Multistage process of drawing steel wire which is coated with zinc or zinc alloy; applying dry or plastic lubricants to wire. No. 2,128,677. Frank Jenks, to Rylands Bros., (Australia), both of Port Waratah, New castle, N. S. W., Australia.

Alloy comprising chromium, nickel, cobalt, tungsten, silicon, vanadium and aluminum. No 2,128,847. Emil M. Prosen, to Nobilium Prods. both of Phila., Pa.

Alloy characterized by being hot workable; comprising tin, iron, manganese, phosphorous and copper. No. 2,128,954. Richard B. Montgomery, Derby, Conn., to American Brass Co., Waterbury, Conn.

Alloy, characterized by being hot workable, composed of tin, iron, phosphorus, and copper. No. 2,128,955. Richard B. Montgomery, Derby Conn., to American Brass Co., Waterbury, Conn.

Bronze alloy composed of copper, tin, nickel, silicon and iron. No 2,129,197. John W. Bryant, Jr., Minneapolis, Minn.

Alloy characterized by high resistance to deformation and abrasion, containing manganese, boron, molybdenum, carbon, and iron. No. 2,129,346. Anthony G. de Golyer, N. Y. City.

Alloy, characterized by high resistance to deformation and abrasion, containing manganese, boron, carbon, and iron. No. 2,129,347. Anthony G. de Golyer, N. Y. City.

Production manganese-boron alloy. No. 2,129,348. Anthony G. de Golyer, N. Y. City.

Treating impure lead and/or tin metal. No. 2,129,445. Frederick Rehns, Springfield, Mass., to American Metal Co., N. Y. City.

Manufacture wrought iron by the Aston process. Nos. 2,129,716-7-8. Edward B. Story, Dormont, and Evard P. Best, Edgeworth, Pa., to A. M Byers Co., Pittsburgh, Pa.

Production palladium-silver-platinum alloys. No. 2,129,721. Edmund M. Wise, Westfield, N. J., to International Nickel Co., N. Y. City.

Treatment ores of metals; first treating ore to produce sands and slimes. No. 2,129,760. William E. Greenawalt, Denver, Colo.

Heat-resisting object containing iron and aluminum. No. 2,129,840. Werner Hessenbruch, Hanau-on-Main, Germany.

Porous structure made by first mixing an unalloyed finely divided oxide of copper with an ammoniacal salt. No. 2,129,844. Edwin F. Kiefer, Cleveland, Ohio, to Union Carbide & Carbon Corp., corp. of N. Y.

Material for adding to a blast furnace or cupola burden to improve the quality of the iron or to produce metallic manganese or ferro-manganese. No. 2,130,228. Henry R. Clarke, Chattanooga, Tenn.

Leaching-precipitation-flotation process. No. 2,130,278. Harmon E Keyes, Miami, Ariz.

Froth flotation of minerals from carbonaceous ores in presence of a collecting reagent. No. 2,130,574. Chas. H. Breerwood, Narbeth, Pa., to Separation Process Co., corp. of Del.

Alloy containing cobalt, cadmium, silicon and copper. No. 2,130,737. Franz R. Hensel and Earl I. Larsen to P. R. Mallory & Co., all of Indianapolis, Ind.

Alloy containing cobalt, cadmium, phosphorus, and copper. No. 2,130,-738. Franz R. Hensel and Earl I. Larsen to P. R. Mallory & Co., all of Indianapolis, Ind.

Recovery of a light metal from a molten mixture of said metal. No 2,130,801. Robert Edwin Hulse, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Forgeable high speed steel containing carbon, tungsten, chromium, vanadium, molybdenum, cobalt, boron, and iron. No. 2,130,822. Elmer B. Welch to Firth-Sterling Steel Co., both of McKeesport, Pa.

Apparatus and method for distillation of metal powders to recover purified metal. No. 2,130,886. Frank R. Kemmer, Larchmont, N. Y., to Magnesium Products, Inc., Pittsburgh, Pa.

Copper-zirconium-manganese alloy. No. 2,130,996. Franz R. Hensel and Earl I. Larsen to P. R. Mallory & Co., all of Indianapolis, Ind.

Preparation ores for reduction. No. 2,131,006. Reginald S. Dean, Washington, D. C., to Chicago Development Co., Chicago, Ill.

Production silver from raw liquids; using alkali and salt in process No. 2,131,072. Marvin J. Reid to Eastman Kodak Co., both of Rochester N. Y.

Method agglomerating comminuted zinciferous materials. No. 2,131,074 John F. W. Schulze, Shaker Heights, O., to du Pont, Wilmington, Del.

Aluminum alloy composed of silicon, nickel, copper, magnesium, vanadium, and aluminum. No. 2,131,076. Harvey G. Schwarz, Seattle, Wash., to Bernard B. Pelly.

Production copper-silver-beryllium-manganese alloy. No. 2,131,104 Franz R. Hensel and Earl I. Larsen, to P. R. Mallory & Co., all of Indianapolis, Ind.

Treatment substances containing tantalum and/or niobium. No. 2,131,-350. Joseph Pierre Leemans, Hoboken-lez-Anvers, Belgium, to Societe Generale Metallurgique de Hoboken, Hoboken-lez-Anvers, Belgium.

Pressure exerting electrode having a hard wear resisting contact surface, comprising an age hardened alloy composed of copper, cobalt and beryllium. No. 2,131,475. Franz R. Hensel and Earl I. Larsen, to P. R. Mallory & Co., all of Indianapolis, Ind.

Heat treated and artificially aged aluminum base alloy. No. 2,131,520. Joseph A. Nock, Jr., Tarentum, Pa., to Aluminum Company of America, Pittsburgh, Pa.

Bright annealing of carbon-containing metal. No. 2,131,709. Vincent T. Malcolm to Chapman Valve Mfg. Co., both of Indian Orchard, Mass.

Treatment chromium austenitic steel, using ammonia in process. No. 2,131,710. Vincent T. Malcolm to Chapman Valve Mfg. Co., both of Indian Orckard, Mass.

Method improving surface castings of copper and its alloy; introducing a volatile flux into a dressed metallic mold and pouring molten metal therein. No. 2,131,719. Cyril Stanley Smith, Cheshire, Conn., to Anaconda Copper Mining Co., New York City.

Naval Stores

Production esters of hydrogenated abietyl alcohol. No. 2,130,740. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Treatment rosin ester by contacting same in liquid phase with a hydrogenation catalyst in absence of added substances capable of reducing the unsaturation of the ester whereby the unsaturation of the rosin ester is reduced. No. 2,130,997. Edwin R. Littmann to Hercules Powder Co., both of Wilmington, Del.

Paper and Pulp

Method incorporating a wetting agent in a thin, porous paper, calendering, impregnating treated paper with a moistureproofing composition in the molten state. No. 20,847. Reissue. Theron G. Finzel and Donald E. Drew, Kenmore, N. Y., to du Pont, Wilmington, Del.

Method coating paper. No. 2,130,241. James D. MacLaurin, East Orange, N. J., to Seaman Paper Co., Chicago, Ill.

Petroleum Chemicals

Decomposition of hydrocarbon oils. No. 2,128,502. Harold R. Snow, Hammond, Ind. to Standard Oil Co., Whiting, Ind.

Lubricant composition comprising a hydrocarbon lubricant containing a synthetic organic acid. No. 2,128,574. Adrianus Johannes van Peski and Willem Coltof, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Carbon and gum remover, composed of liquid sulfur dioxide soluble portion of volatile petroleum hydrocarbon oil, lubricating oil, alkali metal soap of oleic acid, liquid aliphatic alcohol, and water. No. 2,128,685. Wallace J. Yates, Martinez, Calif., to Shell Development Co., San Francisco, Calif.

Conversion hydrocarbon oils. Nos. 2,128,897-8. Charles H. Angell to Universal Oil Products Co., both of Chicago, Ill.

Production anti-knock motor fuel. No. 2,128,910. Joseph Elliott Bludworth, Arlington, Tex., to Celanese Corp. of America, corp. of Del.

Production improved mineral lubricating oils; subjecting a mineral lubricating oil to extraction by means of a mixture consisting of nitrobenzene and acetonitrile. No. 2,128,958. Martin Mueller-Cunradi and Robert Uloth, Ludwigshafen-on-Rhine, Germany, to I. G., Frankfort-on-Main, Germany.

Treatment still residues resulting from distillation of crude solvent naphtha and containing indene polymers. No. 2,128,984. William H Carmody, Dayton, Ohio, to Neville Co., Pittsburgh, Pa.

Treatment heavy oil comprising lower polymers of coumarone and indene. No. 2,128,985. William H. Carmody, Dayton, Ohio, to Neville Co., Pittsburgh, Pa.

Motor fuel; denaturing power alcohol made by dissolving in the alcohol a number of alkyl isonitriles to render alcohol unpotable, certain of which isonitriles boil above and certain boil below ethyl alcohol. No. 2,128,987. Leo M. Christensen, Atchison, Kans., to Chemical Foundation, Inc., corp. of Del.

Process improving motor fuel. No. 2,129,142. Ward E. Kuentzel, Whiting, Ind., Theodore A. Geissman, Minneapolis, Minn., and Howard R. Batchelder, Hammond, Ind., to Standard Oil Co., Chicago, Illinois.

Process for inhibiting gum formation in hydrocarbon-containing motor fuels. Nos. 2,129,193-4. Arthur L. Blount, Palos Verdes Estates, and Harold G. Reiber, Long Beach, Calif., to Union Oil Company of Calif. Los Angeles, Calif.

Conversion of hydrocarbons. No. 2,129,269. Joseph P. Furlong, Jersey City, N. J., to Amarel Corp., Newark, N. J.

Manufacture lubricant comprising in combination a hydrocarbon oil and an organic silicon compound having at least one carbon-silicon bond. No. 2,129,281. Bert H. Lincoln and Gordon D. Byrkit, to Continental Oil Co., all of Ponca City, Okla.

Extraction undesirable constituents from wax-containing mineral lubricating oils. No. 2,129,282. James Morris Page, Jr., Casper, Wyo., to Standard Oil Co., Chicago, Ill.

Hydrocarbon oil conversion. No. 2,129,506. Albert P. Sachs to Petroleum Conversion Corp., both of New York City.

Manufacture improved lubricating oils. No. 2,129,616. Wolfgang Grote and Alfred Hoppe, Berlin-Wilmersdorf, Germany, to Edeleanu Gesellschaft, m.b.H., corp. of Germany.

Production liquid hydrocarbons from gaseous olefines. No. 2,129,649 Thomas Cross, Jr., and Stewart C. Fulton, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Conversion gaseous olefines to higher boiling polymers; contacting olefines with a catalyst, the initial constituents of which are zirconia and zinc oxide on silica gel. No. 2,129,732. Stewart C. Fulton and Thomas Cross, Jr., Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Conversion gaseous olefines into higher boiling polymers; contacting olefines with a catalyst composed of a compound of a heavy metal of Group 111 of the Periodic System associated with silica gel. No. 2,129,-733. Stewart C. Fulton and Thomas Cross, Jr., Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Settling aid in heavy solvents. No. 2,129,752. James M. Whiteley Roselle, N. J., to Standard Oil Development Co., corp. of Del.

Art of drilling oil and gas wells; circulating in drill hole during drilling operation a drilling fluid containing cellulose in regenerated form and adapted to be regenerated. No. 2,129,913. Roy Cross and Walter M. Cross, Jr., to Kansas City Testing Laboratory, both of Kansas City, Mo.

U. S. Chemical Patents

Off. Gaz.—Vol. 493, Nos. 4, 5—Vol. 494, Nos. 1, 2, 3, 4—p. 61

Conversion hydrocarbon oils. No. 2,129,931. Jacob Benjamin Heid to Universal Oil Products Co., both of Chicago, Ill.

Production lubricating oils. No. 2,130,024. Mathias Pier, Heidelberg, and Friedrich Christmann, Ludwigshafen-on-Rhine, Germany, to Standard I. G. Co., Linden, N. J.

Preparation sulfamic acid fluorides. No. 2,130,038. Gerhard Schrader and Otto Bayer, Leverkusen-I. G. Werk, Germany, to Winthrop Chemical Co., N. Y. City.

Stabilized compositions comprising aliphatic ethers. No. 2,130,078 Theodore Evans, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Inhibition of peroxide formation in aliphatic symmetrical isoethers No. 2,130,079. Theodore Evans, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Inhibition of peroxide formation in aliphatic ethers. No. 2,130,080 Theodore Evans, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Halo-substitution of unsaturated organic compounds. No. 2,130,084. Herbert P. A. Groll and George Hearne, Berkeley, and James Burgin and Donald S. La France, Oakland, Calif., to Shell Development Co., San Francisco, Calif.

Production a viscous lubricating fraction of petroleum having a low viscosity-gravity constant from a viscous fraction of petroleum oil. No. 2,130,126. Seymour W. Ferris, Aldan, Pa., to Atlantic Refining Co., Phila., Pa.

Separation high molecular mixtures into fractions having different properties. No. 2,130,147. Oswald H. Milmore, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Conversion hydrocarbons to produce motor fuel. No. 2,130,313. Joseph M. Barron, Port Arthur, Tex., to Texas Co., New York City.

Conversion hydrocarbon oils. No. 2,130,363. Edwin F. Nelson to Universal Oil Products Co., both of Chicago, Ill.

Conversion hydrocarbon oils. Nos. 2,130,407-8. Chas. H. Angell to Universal Oil Products Co., both of Chicago, Ill.

Conversion hydrocarbon oils. No. 2,130,436. Kenneth Swartwood to Universal Oil Products Co., both of Chicago, Ill.

Anhydrous lubricant comprising petroleum lubricating fractions, unsaponified liquid fat, a soap of a liquid fat, and a solid fatty acid material. No. 2,130,540. Marcellus T. Flaxman, Wilmington, Calif., to Union Oil Co. of Calif., corp. of Calif.

Production condensation product of a ketaldone. No. 2,130,592. Sumner H. McAllister, Lafayette, and Edwin F. Bullard, Oakland, Calif., to Shell Development Co., San Francisco, Calif.

Method treating a plurality of heavy hydrocarbon oils for subsequent cracking. No. 2,130,596. Ernest A. Ocon, New York City.

Production motor fuel. No. 2,130,662. Harold V. Atwell, White Plains, N. Y., to Process Management Co., N. Y. City.

Motor fuel combustion lubricant comprising mixture of castor oil and the higher alcohols mixture obtainable by catalytic pressure hydrogenation of oxide of carbon. No. 2,130,664. Julius F. T. Berliner to du Pont, both of Wilmington, Del.

Production valuable products from hydrocarbon gases. No. 2,130,669 Warren K. Lewis, Newton, Mass., to Standard Oil Development Co. corp. of Del.

Treatment hydrocarbon oils by fractional distillation. No. 2,130,988 Jos. K. Roberts, Hammond, Ind., to Standard Oil Co. (Ind.), Chicago Ill.

Method activating and maintaining activity of dehydrogenation catalysts No. 2,131,089. Otto Beeck, Berkeley, James Burgin, Oakland, and Herbert P. A. Groll, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Treated lubricant having a low coefficient of friction and adapted t form a persistent film stable under high temperatures and pressures. No. 2,131,138. Albert Ernst Ganzert, Chicago, Ill., to Ernest C. Shaw.

Method using reclaimed lubricants containing self-generated acids and colloidal impurities. No. 2,131,139. Albert Ernst Ganzert, Chicago, Ill., to Ernest C. Shaw.

Cracking and extracting hydrocarbon oils with a selective solvent. No. 2,131,169. Edward F. English, Baton Rouge, La., to Standard Oil Development Co., corp. of Del.

Dispersion olefines in acid polymerization. No. 2,131,191. Bruno E. Roetheli and Eldon E. Stahly, Baton Rouge, La., to Standard Oil Development Co., corp. of Del.

Production drying oils; first subjecting a fraction of gasoline obtained by vapor phase cracking of higher boiling mineral oils, in liquid phase to action of a gas containing oxygen. No. 2,131,195. Helmuth G Schneider and Julius V. Sommer, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Production valuable high molecular weight polymers; maintaining a low molecular weight olefine in liquid phase in intimate contact with a polymerizing catalyst. No. 2,131,196. Helmuth G. Schneider, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Separation of paraffinic and non-paraffinic portions of a petroleum lubricating oil fraction. No. 2,131,422. Alvin P. Anderson, Alton, Ill., to Shell Development Co., San Francisco, Calif.

Method refining cracked oil by using metallic soaps of naphthenic acid. No. 2,131,519. Masakichi Mizuta, Marunouchi, Kojimachiku, Tokyo, and Teiji Yoshimura, Okubo, Kashiwazakimachi-, Kariha-gun, Nigata-ken Japan, to Nippon Sekiyu Kabushiki Kaisha, Tokyo, Japan.

Sweetening oils with aqueous copper chloride solutions. No. 2,131,525. Walter A. Schulze to Phillips Petroleum Co., both of Bartlesville, Okla.

Pigments, Dry Colors

Preparation stable thermoplastic pigment suspensions; intimately mixing a thermoplastic material, a titanium pigment, and a lipoid. No. 2,130,554. Pierre Lusseyran, Paris, France, to Titan Co., Wilmington, Del.

Preparations suspensions of inorganic pigment particles in waxes. No. 2,130,560. Walter H. Plechner and Jos. M. Jarmus, Metuchen, N. J., to National Lead Co., N. Y. City.

Preparation a water-soluble titanium composition by means of a thermal reaction between sulfuric acid and a titanium-bearing material. No. 2,130,565. Chas. L. Schmidt, St. Louis, Mo., to National Lead Co., N. Y. City.

Manufacture zinc pigment. No. 2,131,313. Henry Seymour Colton, Shaker Heights, O.

Continuous process of treating flocculent carbon black to produce a free-flowing, non-dusting granular product. No. 2,131,686. George L. Heller and Carl W. Snow, Pampa, Tex., to General Atlas Carbon Co., Dover, Del.

Resins, Plastics, etc.

Process for preparing plastic materials to be molded under heat and pressure; applying to surface of the preform a solution containing a mold lubricant which is insoluble in the molding material. No. 2,128,534. Arthur M. Howald, Toledo, Ohio, to Plaskon Co., corp. of Del.

Resinous impregnating material. No. 2,128,879. Kenneth M. Irey and Lawrence M. Debing, Palisades Park, N. J., to Resinox Corp., N. Y. City.

Preparation resinous reaction products of sulfur dioxide and olefines. No. 2,128,932. Louis H. Fitch, Jr., and Frederick E. Frey to Phillips Petroleum Co., all of Bartlesville, Okla.

Production a new resin-like product obtained by condensation of o-cresol and 2-decalol and subsequent hydrogenation of the condensation product. No. 2,129,153. Erik Schirm, Dessau-in-Anhalt, Germany.

Preparation thin filaments, bands or films from polystyrol. No. 2,129,213. Walter Harz, Dormagen-on-Rhine, and Walther Schieber, Berlin, Germany, to I. G., Frankfort-on-Main, Germany.

Flowable composition comprising ethyl formate and a polyvinyl formaldehyde acetal resin. No. 2,129,449. Ralph H. Talbot and Bruce E. Gramkee, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Polyvinyl acetal resin. No. 2,129,450. Ralph H. Talbot, Rochester N. Y., to Eastman Kodak Co., Jersey City, N. J.

Production polymerized products from undissolved aliphatic esters of acrylic and methacrylic acids, carrying out polymerization in presence of an unsaturated cyclic compound of the terpene series. No. 2,129,478 Otto Rohm, Darmstadt, Germany, to Rohm & Haas Co., Phila., Pa.

Mixture of methacrylic acid esters of the mixture of primary, straight and branch chain alcohols obtained by catalytic hydrogenation of carbon oxides under elevated temperatures and pressures. No. 2,129,662. Harold J. Barrett and Daniel E. Strain to du Pont, all of Wilmington, Del.

Production esters of methacrylic acid. Nos. 2,129,664-5-6-7-8. Harold J. Barrett and Daniel E. Strain to du Pont, all of Wilmington, Del.

Preparation the polymeric methacrylic acid ester of a phenol by polymerizing the monomeric ester by heating in presence of benzoyl peroxide. No. 2,129,685. George D. Graves, to du Pont, both of Wilmington, Del.

Preparation polymeric methacrylic acid ester of an aliphatic polyhydric alcohol containing one unsubstituted hydroxyl group, prepared by heating the monomeric ester in presence of benzoyl peroxide. No. 2,129,694. Emmette F. Izard, Elsmere, Del., to du Pont, Wilmington, Del.

Production esters of methacrylic acid. No. 2,129,722. John C. Woodhouse, Cragmere, Del., to du Pont, Wilmington, Del.

Molding composition. No. 2,129,749. Edward Henry George Sargent, Hull, England, to Reckitt & Sons, Hull, England.

Production laminated article of transparent cellulose sheeting coated with an adhesive and printed in intaglio ink. No. 2,129,929. Irving Gurwick to Shellmar Products Co., both of Mount Vernon, O.

Tooth cleansing agent having as mechanical cleansing agent a solid powdered artificial resin. No. 2,130,034. Hans Schmidt, Wuppertal-Vohwinkel, Germany, to Winthrop Chemical Co., N. Y. City.

Fast colored plastic composition consisting of a nitrocellulosic plastic mass and a complex metal compound of a logwood extract. No. 2,131,154. Fritz Straub and Hans Mayer, to Society of Chemical Industry in Basle, all of Basel, Switzerland.

Plastic composition which before exposure to air has a doughy, putty-like consistency and on mere exposure to air has the general characteristics of wood, composed chiefly of finely divided wood filler and a binder of synthetic resin. No. 2,131,371. Gustavus J. Esselen, Swampscott, Mass., to A. S. Boyle Co., Cincinnati, O.

Rubber

Preparation solutions of vulcanized rubber in organic solvents of fine colloidal up to molecular dispersion. No. 2,128,654. Nikolaus Lebedenko, Max Naphtali, Nicolaus Kroll, and Hermann Meyer, Berlin, Germany, to Commercial Ingredients Corp., N. Y. City.

Process rubber vulcanization, carrying out process in presence of a condensation product of an aliphatic aldehyde and an ethylene diamine. No. 2,129,615. William C. Calvert, Oak Park, Ill., to Wingfoot Corp., Wilmington, Del.

Vulcanized rubber, using an arylene thiazyl sulfide accelerator and an added amount of an activator. No. 2,130,242. William E. Messer, Cheshire, Conn., to United States Rubber Prods., N. Y. City.

Fusible, plastic, homogeneous and tacky electrical insulation, consisting of rubber and chlorinated diphenyl. No. 2,130,264. Frank M. Clark, Pittsfield, Mass., and John H. Koenig, Columbus, Ohio, to General Electric Co., corp. of New York.

Rubber article having embedded therein strengthening cotton threads, latter having coating of cellulosic substance. No. 2,130,413. John L. Bitter, Johnson City, Tenn., to No. American Rayon Corp., N. Y. City.

Manufacture artificial leather; using a rubber dispersion in process. No. 2,131,022. Steven Jan Blaupot ten Cate, Kootwijk, Netherlands.

Manufacture expanded rubber having a non-objectionable odor. No. 2,131,073. Dudley Roberts, New York City, and James S. Reid, Cleveland, O., Reid assignor to Rubatex Prods., N. Y. City.

Rubber vulcanization; mixing a vulcanizable rubber composition with a mercaptothiazole accelerator and a mixed oxalate of an aryl substituted guanidine. No. 2,131,126. William P. ter Horst, Packnack Lake, N. J., to U. S. Rubber Co., N. Y. City.

Method accelerating vulcanization of rubber; vulcanizing rubber in presence of an activatable organic accelerator. No. 2,131,127. William P. ter Horst, Silver Lake, O., to U. S. Rubber Co., N. Y. City.

Preservation rubber; incorporating therein a secondary N-aromatic ar-tetra-hydro-naphthylamine. No. 2,131,206. Ira Williams, Woodstown, N. J., and Arthur Morrill Neal, Wilmington, Del., to du Pont, Wilmington, Del.

Method vulcanizing rubber; using a quaternary ammonium salt in process. No. 2,131,244. Ira Williams, Woodstown, N. J., to du Pont, Wilmington, Del.

Method vulcanizing rubber. No. 2,131,245. Ira Williams, Woodstown, N. J., and Frank Rea Mayo, Wilmington, Del., to du Pont, Wilmington, Del.

Concentration of aqueous dispersions of rubber and similar rubber-like substances. No. 2,131,333. Hans Dietrich Graf von Schweinitz, Frankfort-on-Main-Hochst, Germany, to Revertex, Ltd., London, England.

Alkali process for reclaiming rubber waste; heating waste in presence of a non-aqueous vapor or gas comprising an alkaline rubber swelling agent at temperature exceeding 150°C. for a period sufficient to render material plastic. No. 2,131,685. Ernest Bemelmans, Maastricht, Netherlands, to Usitall Co., N. Y. City.

U. S. Chemical Patents

Off. Gaz.—Vol. 493, Nos. 4, 5—Vol. 494, Nos. 1, 2, 3, 4—p. 62

Textiles, Rayon

Method treating fabrics. No. 2,128,516. Clarence T. Graham to William H. Bannon, both of Mansfield, Mass.

A low-lustre artificial silk filament containing finely divided and uniformly distributed particles of boron nitride and an oily material. No. 2,128,604. Robert F. Davis, Arlington Ridge, Va., to American Enka Corp., Enka, N. C.

Process desulfurizing artificial silk; dissolving in viscose, sodium borneol xanthate, spinning viscose in precipitating bath, washing, and desulfurizing deacidified threads by treatment with a solution of the sodium salt of sulfonated olive oil. No. 2,128,612. Emil Hubert Dessau-Ziebigk, and Hermann Hecht, Dessau, Germany, to I. G., Frankfort-on-Main, Germany.

Process for improving lustrous fibrous materials. No. 2,128,613. Walter Kling and Ernst Gotte, to Boehme Fettchemie-Gesellschaft m.b.H., all of Chemnitz, Germany.

Manufacture artificial threads, filaments, etc., by the centrifugal process. No. 2,128,818. Horace James Hegan, Coventry, England, to Courtaulds, Limited, London, England.

Method and apparatus for manufacturing feather cottons; in one step in process impregnating feathers with formalin vapours to form a waterproof coating in the interior and on the exterior by the combination of formalin and a gelatinous substance. No. 2,129,219. Moichiro Koga Tokyo, Japan.

Textile fabric containing threads of a flat, relatively narrow, cut, laminated material, containing a narrow strip of metal foil interposed between narrow strips of transparent cellulose acetate. No. 2,129,504. Karl E. Prindle, Shaker Heights, O., to Dobeckmun Co., Cleveland, O.

Treatment rayon; covering same with an adhesive by first applying a protein adhesive, then applying latex, then rubber, finally vulcanizing. No. 2,129,623. William Howard Nicol, Cuyahoga Falls, O., to Wingfoot Corp., Wilmington, Del.

Production ornamental compound sheet materials; effecting adhesion between a transparent foil having basis of an organic derivative of cellulose and the pile face of a crushed pile fabric in which pile comprises yarns of an organic derivative of cellulose, softening said materials by means of an organic solvent, then pressing both together. No. 2,130,359. Brian, Edw. Merriman Miller, London, England, to Celanese Corp. of America, corp. of Del.

Method fulling or felting wool or hair in alkaline, neutral or acid medium; using as fulling agent a mixture of alkali metal hexametaphosphate and an alkali metal pyrophosphate. No. 2,130,570. Anton Volz, Ludwigshafen-am-Rhine, Germany, to Hall Labs., Inc., Pittsburgh, Pa.

Manufacture synthetic fibres from polyamides derived from diamines and dibasic carboxylic acids. No. 2,130,948. Wallace Hume Carothers to du Pont, both of Wilmington, Del.

Process washing, desulfurizing, bleaching, finishing and like treatments of artificial yarns. No. 2,131,409. Alfredo Nai, to "Chatillon" Societa Anonima Italiana per le Fibre Tessili Artificiali, both of Milan, Italy.

Water, Sewage Treatment

Method of treating sewage,, etc. No. 2,129,267. Anthony J. Fischer, Jackson Heights, L. I., N. Y., to Dorr Co., New York City.

Sterilization of water; treating same at room temperature with 1,3-dichlor, 5,5-dimethylhydantoin. No. 2,130,805. Arthur A. Levine Niagara Falls, N. Y., to du Pont, Wilmington, Del.